



# **Legislative Department Seattle City Council Memorandum**

**Date:** October 24, 2005

**To:** Councilmembers

**From:** Bill Alves, Ben Noble and Norm Schwab, Central Staff

**Subject:** Consultant Report on Monorail

Attached you will find a copy of the report by the consultant team that was engaged in the fall of 2004 to complete an independent analysis of the Seattle Monorail Project's (SMP) formal financial submittal, per the terms of the Transit Way Agreement (TWA) and consistent with Council Resolution 30693. The consultant team was led by Manuel Padron & Associates and included Nancy Whelan Consulting, Causeway Financial Consulting and Thompson Coburn, LLP. As you know, the Mayor cancelled the TWA. In this context, this consultant report does not represent the formal financial review by Council that was previously anticipated.

Instead, this report assesses several key aspects of the financial underpinnings of the proposed monorail project that remain relevant to any future monorail proposal that may come before the Council for its review and consideration. This assessment includes: (i) an evaluation of the existing two contracts to design, build and operate the proposed line; (ii) a technical analysis of the approach used to model ridership and estimate fare revenues; and (iii) a review of the various estimates of future MVET revenues. These remain relevant because SMP's most recent proposal for a shorter line is based on the existing contracts, appears to rely on the same ridership/fare revenue models, and faces the same constraints with respect to MVET revenues.

A brief review of events over the past few months should help you better understand both the context for this report and the scope of work it includes. When the SMP Board rejected the debt structure that was proposed by its management team this past June, City Council staff considered suspending the work of the consultant team. However, we determined that other important aspects of the project's financial underpinnings had not been rejected by the SMP and that an analysis of these issues would have value to both the SMP and the City Council. For these reasons the consultant team was directed to continue most of its work. Council staff modified the scope of the consultant's assessment, however, to reflect the fact that the bonding structure had been rejected and the consultant's attention shifted to focus on the three areas noted above.



# Seattle City Council

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## Preliminary Review of the Seattle Monorail Project Green Line

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submitted by

**Manuel Padron & Associates, Inc.**

in association with

**Nancy Whelan Consulting**

**Causeway Financial Consulting**

**Thompson Coburn LLP**

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## 1.0 EXECUTIVE SUMMARY

### 1.1 REPORT HIGHLIGHTS

This preliminary review of the Seattle Monorail Project's (SMP) original proposed plan was prepared at the request of the Seattle City Council. The scope of the review was to assess the Design-Build-Equip Contract (DBEC), the Operate and Maintain Contract (OMC), funding and revenue, capital and operating costs, and financial capacity. Key findings of the assessment are provided below.

- The ***Design-Build-Equip Contract (DBEC)*** is well prepared and meets industry standards. Some provisions of the DBEC exceed industry standards.
- The ***Operate and Maintain Contract (OMC)*** meets many industry standards, but creates potential financial exposure to SMP, and possibly to the City of Seattle, because many of the future costs remain unknown. These costs include potential adjustments to the operations and maintenance price and specific contractor exclusions. Not knowing future costs presents risk, especially when the monorail is to be self-sufficient by 2020.
- ***Motor Vehicle Excise Tax (MVET)*** is the only source of revenue other than short term loans currently available for monorail project construction. MVET revenue estimates indicate potentially significant risk to the monorail. Actual MVET revenues have been lower than originally estimated, and the base and growth rates have been the subject of debate among area economists.
- ***Fare revenues*** may be overstated due to inconsistencies among the assumptions in the travel demand model, SMP cash flow forecast, and recent King County Metro data. An order-of-magnitude assessment of potential financial impacts of using the same assumptions for estimating ridership and fare revenue indicates that fare revenue would be 31% less (in year of expenditure dollars) than what was included in the SMP cash flow forecast that was available for our analysis.
- The inconsistencies among the ridership model, SMP cash flow forecast, and the DBEC and OMC result in either an underestimation of ***capital and operating costs***, or an overestimation of ***ridership***.
- SMP's relatively heavy reliance on ***tourist products***, such as the Explorer Pass, to fund operations presents significant risks to the ability for monorail operations to become self sufficient by 2020.
- Any proposed ***bond structure*** used to finance the monorail project should be evaluated in terms of its risk due to deviations from conventional debt financing (including debt terms beyond the normal 30 years), increased costs due to increased risks, and the benefits of the increased costs and risks.

## 1.2 OVERVIEW

This report represents a preliminary assessment of key aspects of the Seattle Popular Monorail Authority's (Seattle Monorail Project or SMP) original proposed plan for building and operating the full monorail Green Line. The SMP was charged by voters with building the monorail Green Line connecting various neighborhoods with downtown. In June 2004, as part of its due diligence on behalf of the people of the City of Seattle, the City Council decided to undertake a review of the financial viability of the Green Line before allowing City departments to issue construction permits. On June 30, 2005 the SMP Board voted not to accept the SMP staff-recommended financial plan. On September 16, 2005 Mayor Greg Nickels withdrew support for building the monorail, citing a risky financial plan that did not protect taxpayers or the City. On September 23, 2005 the Seattle City Council unanimously passed a resolution that supported the Mayor's position.

Due to some of the events cited above, the scope of this analysis was modified to reflect the fact that no formal financial submittal was anticipated in the near-term from SMP. Instead of focusing on a specific financial plan, the analysis shifted to a more general assessment of the construction and operating contracts, ridership and revenue forecasts, and overall financial capacity.

Our assessment consisted of a review of the Design-Build-Equip Contract (DBEC) and Operate and Maintain Contract (OMC) of June 17, 2005; and assessments of funding and revenue, capital and operating costs, and financial capacity.

## 1.1 SUMMARY OF FINDINGS

### 1.2.1 Findings for the Design-Build-Equip Contract (DBEC)

Our review of the Design-Build-Equip Contract is presented in section 3.1. Overall, we found the DBEC to be a well-prepared contract that met industry standards, and was better than industry standards for some matters.

**Financial Exposure** – We reviewed three areas: 1) Insurance; 2) General Indemnification; and 3) Bonding.

- For insurance (Builder's Risk, Workers Comp., General, Comprehensive/Professional Liability; several other coverages), in our opinion we found the contract to be adequate in the major areas, and is better than average for Comprehensive/Professional Liability. The City of Seattle is listed as an additional insured.
- For General Indemnification (Hold Harmless), the DBEC good in scope with industry standard or better, and has normal exclusions. The City of Seattle is directly indemnified as to matters of the Transit Way Agreement, but possibly with exclusions (i.e. to the extent that the City has been indemnified by SMP through the Transit Way Agreement,

these responsibilities could be passed through to Cascadia via the DBEC). This area needs further analysis.

- In terms of Bonding, the DBEC has two tiers: 1) \$250 million through bond with back-up guarantee by Fluor; and 2) \$250 million for trains (\$205 million) and bridge work (\$45 million). A corporate guarantee from Fluor Corporation is also provided. As a point of comparison, if this were a federally-funded project, the FTA would normally require a 100% performance bond equal to the value of the project (\$1.6 billion for the 14-mile project). A performance bond that large is difficult to obtain, so the manner in which this issue is addressed in the DBEC is probably adequate, especially since Fluor is such a large corporation. The City of Seattle is a dual obligee on the bonds, but its rights are limited to the cost to “teardown” the project and to repair/restore City property. City coverage is not enough to assure project completion.

**Price of Contract**. – Price is \$1.6 billion including almost all costs, with a setting-date of October 18, 2005. Provisions are fairly standard, with one potential item of concern:

- Utility Relocation costs of \$67 million appear to not be included in contract price and does not appear to be capped – if the allowance is exhausted, SMP must use contingency funds for cost overruns. The Utility Relocation and Government Approval contingency fund is \$35 million for the entire project.

**Cost Increases and Approved Delays** – Four key areas that can result in cost increases or approved delay under the Contract, through issuance of change orders: 1) Force Majeure; 2) Differing Site Conditions; 3) Hazardous Material; and 4) Governmental Approvals. These are standard in most design-build contracts.

- For Force Majeure (delays beyond control of contractor, such as natural disasters), contract has fairly standard listing of Force Majeure events. Only unusual item is inclusion of the failure of a utility service that serves the project during and after construction (i.e., Cascadia could be given more time or a project cost increase through change order).
- In terms of Differing Site Conditions (site conditions that differ materially than those in geotechnical report or that would normally be found) and Hazardous Materials, the DBEC has good provisions, with more detail than similar contracts. For Government Approvals, the DBEC includes detail similar to other design-build contracts.

**Change Order Provisions** – The DBEC has approximately 12 items that allow a change order.

- The number of items that can initiate a change order is more than most design-build contracts, but not out of line. The change order exclusions are industry standard. The DBEC contains unusual provision that allows for a change order if contractor’s insurance premium is greater than 120% of initial quote.

**Penalties** – The DBEC has provisions for penalties of \$35,000 per day for not meeting “substantial completion” milestones, and \$17,500 per day for not meeting final completion date.

- The penalty for substantial completion is slightly lower than most DBOM contracts. The DBEC includes a “final completion” penalty that is usually not accepted by contractors, which provides lower risk to SMP.

**Warranties** – The warranty period for vehicles and switches is 16 months, and for everything else is 12 months.

- We could not find a Fleet Defect warranty during our review. A fleet defect warranty is particularly important for new technology vehicles.

### **1.2.2 Findings for the Operate and Maintain Contract (OMC)**

Findings from our review of the Operate and Maintain Contract are presented below. Overall, we found the OMC to provide potentially less protection than the DBEC. The OMC meets many industry standards, but creates potential financial exposure to SMP, and possibly the City, because many of the future costs remain unknown. These costs include potential adjustments to the O&M price and specific contractor exclusions. Not knowing future costs presents risk, especially when the monorail is to be self-sufficient by 2020.

**Compensation and Payment** – The OMC is for annual fixed amount is \$26.625 million (2005\$) with 2.5% inflator, for a term of five years, with two five-year options to renew.

- The OMC includes base amount and allowable adjustments, including contractor-initiated change Orders. Contractor-initiated change orders are highly unusual in OMC contracts.
- The OMC has provision for six exclusions. The price of three exclusions (premiums for bonds and insurance, fare media, and the Capital Asset Replacement Program (CARP)) are to be negotiated within 42 months after operations. Having exclusions is unusual for an operate and maintain contract. For example, if insurance goes up then there may be incentives to lower protections. If the price of the CARP goes up, then there may be incentive to defer maintenance.
- Monthly payments are calculated using a 13-factor formula that could be complicated and spawn disputes. Most OMCs strive for simple payment methods.

**Financial Protection** – We reviewed three areas: 1) Insurance; 2) Bonding; and 3) Indemnification.

- For insurance, the contract appears to be good in scope, limits are reasonable, and coverages are broader than most contracts. The City of Seattle is an additional insured.



- The OMC includes provisions for a \$50 million Payment and Performance bond. Fluor Corporation has provided a corporate guarantee to SMP assuring payment and performance of all obligations of the O&M Contractor. The OMC includes a Dual Obligor Rider giving the City of Seattle an additional protection (although limited). The amount of the Payment and Performance bond would not cover completed operations for the term of the OMC term. Inclusion of a performance bond provides added protection for SMP compared to other operating contracts, as performance bonds are not always included in operating agreements, and when used the bonds are normally not sufficient to cover multiple years of operation.
- The City of Seattle is directly indemnified as to matters of Transit Way Agreement, but possibly with exclusions (i.e. to the extent that the City has been indemnified by SMP through the Transit Way Agreement, these responsibilities could be passed through to Cascadia via the DBEC). This issue requires further analysis (see section 15.2.4). Unlike the DBEC, the OMC uses the term “culpable” rather than “negligent.” Culpable is a higher standard. This provision shifts more risk to SMP (and possibly the City) and away from the contractor.

**Changes in Pricing** – The contract allows for contractor-initiated change orders for: 1) Force Majeure events; 2) Changes in law; 3) Requirements materially different from those assumed by the Contractor in determining the Base O&M Price relating to Governmental Approvals or Third Party Agreements; 4) Repairs/Replacements to property for which SMP bears the risk of loss; and 5) Certain insurance premium increases.

- The ability of the Contractor to initiated change orders as a basis for a price adjustment is not common, and some contracts have no provision authorizing contractor initiated changes. Inclusion of the change order provision makes it difficult to estimate future costs and SMP has less control over its costs.

**Performance Standards and Liquidated Damages** – The OMC contains some maintenance standards, but we found no performance standards such as schedule adherence, missed trips, etc. The only enforcement for performance appears to be: 1) loss of availability of fare collection equipment; 2) failure to meet operating system availability; and 3) elevator and escalator downtime.

- There can be debate as to the proper scope and amount of liquidated damages, but for most contracted transit systems it is critical to have clear and well defined operations performance standards and maintenance standards, and to have a good range of financial sanctions (liquidated damages) that cover all of the standards established. It is not clear that the OMC meets that objective.

### 1.2.3 Findings for Motor Vehicle Excise Tax (MVET) Analysis

Our analysis of Motor Vehicle Excise Tax (MVET) revenue is presented in section 4.1. The analysis of SMP's MVET revenue estimates indicate potentially significant risk to the financial viability of the monorail operations. Actual MVET revenues have been lower than originally estimated, and the base and growth rates have been the subject of debate among area economists. MVET is the only source of revenue other than short-term loans (anticipated to be repaid with MVET revenues) currently available to SMP for monorail project construction. The near complete dependence on MVET revenues through the end of the construction period creates high risk to SMP and possibly the City.

#### **Cash Flow Forecast is Sensitive to Changes in MVET Base and Growth Rate Estimates –**

Though the numerical difference in growth rate percentages may seem small, the effects of these differences for the SMP financial plan can be very significant.

- Reduction in average growth rate of 0.1% results in a loss of \$319 million over 45 years.

**MVET Revenues Lower than Projected** – In August 2003, after SMP's MVET receipts were lower than anticipated, SMP staff revised the MVET base estimate. The decline in receipts can be partially attributed to the difficulty in calculating the MVET base and growth rates. Lower MVET revenues would diminish increase SMP's debt requirements during the construction period and/or create difficulties in meeting a debt repayment plan.

- MVET estimates in November 2002 were 20%-30% higher than August 2003.
- Between March 2002 and August 2003, the MVET base estimate varied between \$7 billion and \$3.7 billion. In the last two years, the estimate has declined from \$3.7 billion to \$3.283 billion.

**Variations in MVET Forecast Assumptions** – Economists have provided several different base and growth rate forecasts for the MVET. SMP uses forecasts that were made by ECONorthwest.

- The Seattle Department of Finance staff argues that the MVET average growth rate should be changed from 6.1 percent per year to approximately 5 percent. A 5% average annual growth versus 6.1% average annual growth results in a decrease of \$4.2 billion over the life of the forecast.
- The SMP Cash Flow Forecast uses an assumed annual growth rate of 6.7% from 2030 to 2050, which matches the growth rate from the last year of the ECONorthwest forecast, although there does not appear to be any additional basis for forecasting a continued annual growth rate of 6.7 percent. Using a more conservative growth rate of 5.6% in outer years results in \$1.08 billion less MVET revenue over the 45-year cash flow. Recently, a financial analysis sponsored by SMP recommended using the lower growth rate in the outer years of the cash flow forecast.

- Financial forecasting tends to be more difficult and imprecise when looking further out in time. As a result of this increasing uncertainty, many financial planners use more conservative projections further out in time. However, the forecast prepared by ECONorthwest that was included in the SMP Cash Flow Forecast projects higher growth rates in the later years of the planning horizon.

#### 1.2.4 Findings for Fare Revenue and Ridership Estimates

Our analysis of fare revenue and ridership estimates is presented in section 4.2. Overall, we found some inconsistencies among the assumptions in the travel demand model, SMP cash flow forecast, and recent King County Metro data. Some of the inconsistencies can be attributed to timing, as documents and forecasts were prepared while the monorail assumptions were still being discussed. Other findings can be attributed to the use of outdated information or an apparent misapplication of the assumptions.

For each of our findings we attempted to assess the potential financial impact on the monorail using data from SMP's Cash Flow Forecast model. SMP's Cash Flow Forecast was only used in an attempt to provide an order-of-magnitude assessment of the impacts. Since a monorail financial plan has not been approved, and since SMP is currently evaluating alternate monorail plans, our analysis only provides an example of how changes to major assumptions could have financial implications on the monorail.

Our findings are summarized in Table 1.1, and presented in further detail below.

<b>Table 1.1</b> <b>Potential Impacts of Changes to Fare Revenue and Ridership Assumptions</b> <b>2011 - 2050</b>		
<b>Adjustment</b>	<b>Estimated Average Fare per Boarding</b>	<b>Cumulative % Change from SMP Average Fare per Boarding</b>
SMP Cash Flow Forecast	\$1.12	
Modify Fare Distribution Among Fare Categories	\$1.09	-2.3%
Adjust Transfer Rate	\$1.06	-4.7%
Follow Regional Transfer Policy	\$0.89	-20.3%
Reflect Potential KCM Fare Increase	\$0.79	-30.3%
Reflect Current KCM Fare Structure	\$0.64	-42.7%

The table reflects the resulting average fare per boarding if our findings were applied to SMP's fare revenue worksheet from the Cash Flow Forecast. This table includes two future fare increases assumed by SMP. Without these two future fare increases, the average fare would be further reduced. SMP estimated that the average fare per boarding would be \$1.12. An average fare per boarding of \$0.64, as we have estimated, would result in approximately 31% less fare revenue (in year-of-expenditure (YOE) dollars) from weekday resident riders than estimated in the SMP Cash Flow Forecast for 2011 through 2050. While SMP may eventually present

alternative financial plans for the monorail, the table shows the sensitivity on fare revenue from changes to basic assumptions.

**Fare Revenue Distribution Among Fare Categories** – For calculating fare revenue, SMP assumed the proportion of peak riders is 76.7%. However, the Cambridge Systematics Incorporated (CSI) ridership forecast projects that 61% of Green Line riders would be peak riders.

- If SMP's Cash Flow Forecast fare distribution is modified to reflect the more recent Metro/CSI data, then SMP fare revenues would be lower than currently projected. Following CSI's fare distribution, the resulting average fare per boarding would be approximately \$1.09, a decrease of 2.3% compared to the \$1.12 that SMP assumed in its June 20, 2005 financial plan.

**Transfer Policy Assumptions** – SMP states that for passengers transferring from another mode to the Green Line, SMP would receive half of the fare revenue as is consistent with the current inter-agency agreement among the transit agencies in the region. However, in the fare revenue worksheet, it appears that SMP made errors in the application of this assumption.

- If the transfer rate is increased from 51% to 59% (which was used for the ridership estimates), the resulting average fare per boarding would be approximately \$1.06, a decrease of 4.7% compared to the \$1.12 that SMP assumed in its June 20, 2005 financial plan.
- Assuming that the transfer rate is adjusted as suggested above, then if the regional transfer policy is followed and SMP receives 50% of the transfer fare, the resulting average fare per boarding would be approximately \$0.89, a decrease of 20.3% compared to the \$1.12 that is assumed in the Cash Flow Forecast.

Both of the above estimates assume that the fare distribution is modified to reflect the more recent Metro/CSI data as suggested earlier.

**Fare and Fare Policy Assumptions** – In most instances, fare and fare policy assumptions should be consistent among King County Metro, the CSI ridership model, and the SMP Cash Flow Forecast. The initial fare assumptions in SMP's Cash Flow Forecast are not consistent with what Metro is likely to propose as part of a future fare increase.

- If Metro increases the peak fare to \$1.75, with reasonable increases in other fare categories, and SMP follows Metro's proposed fare structure, then SMP fare revenues would be lower than currently projected. This would lower SMP's assumed average fare per boarding from \$1.12 to \$0.78, a decrease of 30.3%. This assumes that SMP also modifies its fare distribution percentages and adjusts transfer fares and assumptions as suggested earlier.

- If SMP follows Metro's current fare structure, then SMP fare revenues would be lower than currently projected. With this change, and all of the suggested adjustments to fare distribution and transfers, SMP's assumed average fare per boarding would go from \$1.12 to \$0.64, a decrease of 42.7%. An average fare of \$0.64 without the two future fare increases assumed by SMP would result in 49% less fare revenue (in year-of-expenditure (YOE) dollars) than estimated in SMP Cash Flow Forecast for 2011 through 2050.

In the Cash Flow Forecast, two real increases of \$0.25 in the average fare in 2015 and 2020 are assumed that are not included in the ridership model.

- If SMP's two proposed fare increases are assumed, and assuming a fare elasticity of 0.15<sup>1</sup>, then the ridership could decrease by about 8% to 18%, depending on which full peak fare is assumed. Fare revenue would decrease by 11% to 13% assuming no other changes to fare revenue assumptions.

**Ride Free Area** – The ridership model forecasts are based on assumptions that include the downtown Ride Free Area. However, SMP's fare revenue calculation includes these passengers.

- If SMP intends to honor the Ride Free Area, then the fare revenue estimate needs to be revised downward, to reflect no revenue for several thousand daily trips. On the other hand, if SMP does charge a fare for downtown trips, then the ridership forecast for these trips is over-estimated; few passengers will pay a \$1.75 fare to ride a short distance on the monorail when they can make a similar trip for free by bus or light rail. In addition, bus frequency would be higher than monorail frequency on many downtown streets, and bus downtown stops at street level provide more convenient access for short trips than elevate monorail stations. We requested, but did not receive, from SMP the ridership forecast for trips in the Ride Free Area. Therefore, we cannot assess the impact of assumptions regarding the Ride Free Area.

**Feeder Bus Service** – In the ridership model, it was assumed that several additional bus routes in the Delridge area would be truncated that were not truncated in KCM's own proposal for Green Line integration. Metro has estimated that truncated lines to provide monorail feeder bus service would save approximately 30,000 service hours. Given the relatively small projected increases in future systemwide bus hours, and the competing demands from other portions of Metro's service area, it is unlikely that Metro would redeploy all 30,000 saved hours into the same area.

- Further analysis would be required to accurately estimate the financial impact of feeder bus service assumptions on the monorail and Metro.

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<sup>1</sup> Fare elasticity is used to estimate the impact of fare changes on transit ridership and fare revenue. A fare elasticity of .15 means that every 10% increase in fare would result in a 1.5% decrease in ridership. A 1991 report by the American Public Transit Association (APTA) estimated fare elasticity for Seattle to be .26 for bus. Rail fare elasticity tends to be lower than for bus, and peak elasticity tends to be lower than off-peak. For this illustration, a fare elasticity of .15 was used, although the average U.S. urban rail elasticity is about .20.

**Timed Transfers** – The ridership model includes an assumption to have timed transfers between buses and monorail service at all monorail stations. This would likely not be possible, as only a few lines could be synchronized.

- Further analysis would be required to accurately estimate the financial impact of time transfer assumptions on the monorail and Metro.

**Major Event Ridership** – SMP adds the estimate of annual major event ridership to annual resident ridership to estimate fare revenue. However, the ridership model's annualization factor inherently includes some major event riders because the transit systems, including Metro, from which it is based, include some special event riders in their annual estimates.

- SMP method for annualizing major event ridership may result in double-counting of some event riders because all special event riders are added to an annual weekday resident figure that has been annualized using a factor that inherently includes some special event riders.

SMP has assumed that 66% of the annual major event riders (1 million) would pay a \$3.00 premium fare, but the major event ridership estimate assumed that no premium fare would be charged.

- If SMP charges a premium fare, then major event ridership would likely be lower than the estimate. Furthermore, at locations where there would be a mixture of event attendees and regular patrons, it is not clear how the higher fare could be charged separately to event riders.

The major event ridership estimate was based on headways of 2 and 4 minutes, but the Initial Operating System will operate at 8-minute headways.

- Since the major event ridership was estimated assuming more frequent headways than are actually going to be operated when the monorail begins service, major event ridership is probably overstated.

The comparison with other cities of potential passengers that may ride the monorail for major events may be misleading. Unlike many of the comparison cities, the Green Line will serve a relatively small portion of the Seattle metropolitan area, and will have no parking at stations. In addition, none of the comparison cities charge higher fares for events.

- The upper-range market capture rates in the major event ridership report appear to be too high.

### **1.2.5 Findings for Non-Farebox Operating and Other Operating Revenue**

Our analysis of non-farebox operating and other operating revenue is presented in section 4.3. For this review, we focused on SMP's proposed tourist products because they are estimated to contribute a relatively high amount of revenue for SMP. SMP's main tourist product is the Explorer Pass.

SMP's relatively high level of reliance on revenue from a tourist product, such as Explorer Pass, to fund operations presents significant risks to the ability for monorail operations to become self-sufficient by 2020. If not for this requirement, the risks would not be as great. The fact that the components of the Explorer Pass have not been finalized presents added risk in itself.

- Information about how price of the Explorer Pass was determined was not available.
- Comparisons with other tourist products in Seattle and transit pricing in Seattle and other U.S. cities indicate that the pass price may be too high to attract sales volumes or generate the assumed net revenues.
- In first year of operations, 14% of fare revenue is from Explorer Pass and 9% of direct operating cost. Comparison to SF cable cars indicates that the fare income expected from Explorer Pass may be too high.
- Placing a relatively high reliance on tourist revenue presents financial risk. There is less certainty in tourist markets than other market segments that would drive monorail ridership.

### **1.2.6 Findings for Capital and Operating Costs**

Our analysis of capital and operating costs is in section 5.1. There are inconsistencies among the ridership model, Cash Flow Forecast, and the design-build contracts that results in either an underestimation of capital and operating costs, or an over-estimation of ridership.

- The 2011 operating plan used to estimate ridership does not match the OMC or SMP cash flow, meaning the ridership is likely overestimated.
- The 2030 service frequency and number of stations used in the ridership forecast and assumed for the OMC are greater than in the SMP Cash Flow Forecast, meaning that O&M costs associated with the increased service were not captured and the capital costs associated with the three additional stations and additional trains were also not included in the Cash Flow Forecast.
- Projected ridership levels appear to exceed the defined system capacity, especially in the 2011 to 2018 time period when the system is expected to carry additional riders due to the removal of the Alaskan Way Viaduct.

- SMP has stated that system capacity can be increased in the future by running trains more frequently (as assumed in the 2030 ridership forecast), and by increasing the train length to more than two cars. While this is physically possible, this configuration could cause train delays as people must walk through the full length of a crowded car to exit the train.
- Monorail vehicles could be very crowded, as the load factor (total vehicle capacity compared to the number of seats) and other measures of comfort are not desirable compared to most U.S. transit operators.
- There appears to be inadequate funding for the Capital Asset Replacement Program, as the funds that SMP is estimating for this purpose are likely not adequate.

### 1.2.7 Findings for Plan of Finance Approach

Our analysis of the plan of finance approach is in section 6.1. Our analysis takes a generic look at financial capacity as it pertains to the Green Line. In general, we recommend that City refer to the rules of thumb outlined in this section to gauge how any proposed bond structure considered by SMP would deviate from them. This will provide a gauge for investors' reception of SMP's bonds.

As in any market, the municipal bond market is driven by supply and demand for commodities such as conventional (i.e. "plain vanilla") bond issues. However, markets can be created for unconventional structures given the right price. The question to SMP and the City is what would be the right price, or interest rate, in order to finance the monorail project? Is the price too steep to be a market maker given the benefits that the monorail project will provide to the taxpayers and citizens of Seattle?

- Deviation from a conventional debt financing approach increases risk. However, this does not mean that approaches that deviate from convention should not be considered. The greater the deviation from convention, the greater the risk. The cost of financing is directly related to risk.
- Even for conventional structures, any extension beyond the normal 30 years would decrease the relative amount available to projects and increase the total amount of debt service.
- Alternative financing structures are often considered to: 1) generate more net funds available for a project; and/or 2) provide a better matching of sources of funds for the payment of debt service. In the case of SMP, both of these outcomes are desirable given the large construction cost requirement and the significant borrowing potential against the future growth of MVET.



- Given the limited capacity to pay debt service in the early years, zero coupon bonds are often the financing tool used to leverage funds. Issuers avoid using zero coupon bonds, if possible, given their non-callable feature and the interest rate penalty associated with it. The interest rate penalty could range from ½ percent to 1½ percent higher than current interest bonds depending on the maturity.
- It appears that there is a significant potential for leveraging future MVET growth, which SMP estimates to grow annually in the 6.0% range starting in 2012. Most bond issues for public transit projects are structured using historical revenue. In the case of SMP, no direct correlation exists between the project and the revenue source. The credit analysis will be based on the MVET forecast which may not provide sufficient comfort to investors.

## 2.0 INTRODUCTION AND BACKGROUND

The Seattle Popular Monorail Authority (Seattle Monorail Project or SMP) was charged by voters with building the monorail “Green Line” connecting various neighborhoods with downtown. In June 2004, as part of its due diligence on behalf of the people of the City of Seattle, the City Council decided to undertake a review of the financial viability of the Green Line before allowing City departments to issue construction permits. The general parameters of this review are outlined in subsection 3.1.1 A of the “Transit Way Agreement,” an agreement between the City and the SMP under which the City gives SMP certain rights to use City rights-of-way for the monorail, and in Resolution 30693. (Ordinance 121517 authorizing execution of the Transit Way Agreement, the Transit Way Agreement itself, and Resolution 30693 are included as Attachments A, B, and C, respectively.) The City Council review was to be solely for the City’s benefit.

On June 20, 2005 SMP staff announced an agreement with Cascadia Monorail Company, LLC to design, build, operate, and maintain the monorail and presented the SMP Board with a related financing plan. The initial finance plan included a fixed price of \$1.615 billion (\$1.35 billion in 2005 dollars) to build the monorail, but was estimated to cost over \$11 billion when financing costs were considered. On June 30, 2005 the SMP Board voted not to accept the financial plan. No subsequent financial plan has been approved by the SMP board, as of the date of this report.

On September 16, 2005 Mayor Greg Nickels withdrew support for building the Seattle Monorail Project, citing a risky financial plan that did not protect taxpayers or the City. On September 23, 2005 the Seattle City Council unanimously passed a resolution that supported the Mayor's cancellation of the Transit Way Agreement and stated the Council's resolve not to allow City departments to issue project construction permits.

Since then, the SMP has proposed a shortened monorail line to cut costs, and has placed a proposition on the November 8, 2005 ballot to seek voter approval of the shortened line. The SMP has announced that a new financial plan was being prepared for the shortened line, but that plan was not available at the time that this report was prepared.

Given that SMP has not made a formal financial submittal to the City and that the Transit Way Agreement has been cancelled, this report does not constitute the review described in Council Resolution 30693. Instead, it represents a preliminary assessment of key aspects of SMP’s original proposed plan for building and operating the full monorail Green Line.

## 2.1 PURPOSE OF THIS ASSESSMENT

This work was begun several months ago at a time when it was not possible to anticipate the recent series of events recited above. After the SMP Board voted not to accept the SMP staff-recommended financial plan, the scope of our analysis was modified to reflect the fact that no

formal financial submittal was anticipated in the near-term from SMP. Instead of focusing on a specific financial plan, the analysis shifted to a more general assessment of the construction and operating contracts, ridership and revenue forecasts, and overall financial capacity. Council's intent was that the results of this analysis could inform SMP's work in developing a new financial plan.

We believe this report will provide potentially useful insights into either the current or future practicality of building and operating all or part of the 14-mile Green Line. Although a shortened line would obviously involve lower construction costs and different operating parameters, it appears that the current proposal to move forward with a shorter line would: 1) build-off the existing set of design-build-operate contracts (or comparable agreements), 2) rely on the same basic approaches to modeling ridership and revenues; and 3) face the same constraints with respect to monorail funding. These three points are the primary focus of this report.

Throughout the report we make reference to SMP's Cash Flow Forecast which was directly related to SMP's June 20, 2005 financial plan. While this review uses some data and cites examples from the Cash Flow Forecast, our findings have been formulated to apply to any financing plan that SMP may subsequently prepare.

During this analysis we reviewed numerous documents related to the Green Line and related transit projects, referenced "best transit industry" practices, conducted interviews with SMP staff, and spoke with representatives at other transit agencies. A list of documents that we reviewed is presented in Appendix A.

It is difficult to find comparative monorail data in North America. We spoke with staff from both the Las Vegas monorail and Vancouver Sky Train. However, much of our analysis can be applied to any major fixed-guideway heavy rail project.

The Federal Transit Administration (FTA) provides guidance for transit agencies regarding the development of financial plans. The FTA New Starts guidelines in particular provide a widely accepted process for evaluating an agency's financial health. Failure to follow FTA guidelines is unto itself not a reason for criticism. In fact, FTA guidelines are sometimes followed simply because most projects are New Start projects.

SMP is not seeking federal funding to construct the Green Line and is not required to follow the FTA guidelines. We used FTA guidelines in some areas of our analysis because they generally provide good benchmarks from which to make comparisons.

As mentioned above, we reviewed documents prepared for the Green Line and met with SMP staff and staff from its consultant team. In September 2005, we had meetings scheduled with SMP staff and its procurement counsel to discuss the preliminary findings for this report and to gather follow-up information from previous requests and correspondences.

After the Mayor withdrew support for building the Green Line, SMP postponed the meetings indefinitely. Consequently, some parts of our review are incomplete and rely on our professional judgment and experience, and upon the SMP data that we could access.

Our review team consists of individuals with extensive experience in public transportation finance, financial markets, and contracting for design-build-operate-maintain projects. Resumes for the review team are presented in Appendix B. The contents of this report are factually correct to the best of our knowledge given the information made available to us.

## **3.0 CONTRACT REVIEW**

The purpose of the contract review is to determine if the Design-Build-Equip Contract (DBEC) and Operate and Maintain Contract (OMC) cover all elements necessary to construct the Green Line and provide for sustainable operation without undue strain on the Contractor or SMP, while minimizing risk to the City of Seattle. Although SMP is seeking voter approval to potentially develop a shorter line, it appears that development and operation of such a system would be tied to modified versions of the existing contracts, or, if re-procurement were eventually pursued, a comparable contract approach. Therefore, this analysis of the existing DBEC and OMC contracts should still be useful. Note that this analysis was done within the context of the Transit-Way Agreement that was in place between SMP and the City. The Mayor has since cancelled this contract, and the City Council supported this cancellation in Council Resolution 30806.

### **3.1 DESIGN-BUILD-EQUIP CONTRACT (DBEC)**

The review of the Seattle Monorail Green Line Design-Build-Equip Contract (DBEC or Contract) focused on the following areas: 1) compensation and pricing; 2) financial protection (specifically, insurance, indemnification, and bonding); 3) change orders; and 4) warranties and liquidated damages.

Overall, the DBEC is a comprehensive agreement that is consistent with current industry practice for design-build contracts of this type. It does a thorough job of addressing the multiple issues that need to be covered, and reflects a fair balance between the interests of SMP and those of the Contractor. There are some issues where it would be preferable to have provisions more favorable or protective of the public agency. For example, it would be better to have more “blanket” or comprehensive indemnification than provided in the Contract. It would also be preferable, and assist in cost containment, to have a more limited set of circumstances that justify a Contractor-initiated change order than the extensive list in the DBEC. However, “owner-friendly” provisions of this type normally have a price, sometimes significant, unless there are substantial competitive or other pressures on the Contractor. In essence, since design-build contracts are the product of negotiations, there are inevitable tradeoffs in risk allocation and pricing – it is almost certain that these types of tradeoffs were involved in the negotiation of this DBEC.

#### **3.1.1 Compensation and Pricing**

The DBEC establishes, in Article 12, a Contract Price of \$1.615 billion. This appears to be a lump sum fixed price (which means that the Contractor is entitled to that amount) rather than a guaranteed maximum price (which means the amount paid cannot exceed the stated amount). Similar to most design-build contracts, this \$1.615 billion can only be exceeded through Change Orders (see discussion below).

However, this price is based on a specific “setting date”. Delay in start up of more than 120 days can result in increases in the Contract Price, equal to 0.25% of original contract price for each month’s delay. It is not clear how this provision would actually operate at this point since the contract is on hold.

In addition, it is not clear whether the Utility Relocation Allowance of \$67 million is included in the Contract Price. Also, the Utility relocation cost does not appear to be capped – if the allowance is exhausted, SMP must use contingency funds for cost overruns (utility Relocation and Government Approval contingency funds equal \$35 million for the entire project).

The progress payments, payment procedures, and final payment processes included in Article 12 of the DBE contract are reasonable and consistent with other design-build contracts. These provisions do include, however, what seems to be rather high mobilization payments (front end payments triggered by the commencement of specific elements of the Work) in a total amount of over \$140 million.<sup>2</sup>

### **3.1.2 Financial Protection**

**Insurance** – The Contractor is required under Article 9 of the DBEC to have a full range of insurance coverages. The scope of the coverages appears to be complete, and the liability limits reasonable for this type of project. Coverages include essential items such as Builder’s Risk, Workers Compensation, General Comprehensive; Professional Liability; and several other coverages. The Contract is adequate in the major areas, and is better than average for Comprehensive/Professional Liability.

The status of an additional insured is beneficial to the City because it provides a form of actual coverage under the named policy(s) rather than having to rely on another party to invoke the insurance.

**Bonding** – The DBEC has two tiers of bonding: 1) \$250 million Payment and Performance Bond; and 2) \$250 million for trains (\$205 million) and bridge work (\$45 million). See section 2.1 for comments on combining the Payment Bond and the Performance Bond. In addition to the bonds provided, the Contract provides a corporate guarantee from Fluor Corporation.

If this were a federally-funded construction project, the Federal Transit Administration (FTA) would normally require a performance bond equal to 100% of the project construction cost, in this case \$1.6 billion. While this requirement exists, it should be acknowledged that a performance bond of over \$1 billion is difficult to obtain, and if obtainable, very expensive. FTA regulations do permit alternative security if it is found to adequately protect the Federal

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<sup>2</sup> For example, the general principle in federally funded projects is that the public agency can make progress payments, based on actual work completed or milestones achieved, but cannot make “advance” payments that are not based on actual incurred costs of the Contractor.

interest, but it does not seem that FTA approves such an alternative very often for construction projects.

The City of Seattle is a dual obligee on the bonds, but its rights are limited to the cost to “teardown” the project and to repair/restore City property. City coverage under the bonds is not enough to assure project completion.

**Indemnification** – Under Article 18 of the DBEC, the Contractor is required to indemnify SMP for claims, damages, and losses that arise out of a series of listed circumstances or events, such as breach of contract, violation of government rules, failure to perform SMP’s obligations under the Transit Way Agreement (see discussion below), and any “misconduct, negligence, or other culpable act” in performance of the Contract. In general, the scope of indemnifications provided in the DBEC is consistent with industry standards or better, and the Contract has the normal exclusions from indemnification. It should also be noted that the DBEC uses a “negligence” standard while, as discussed in the review of the O&M Contract, that Contract limits the indemnification obligation to “culpable” acts or omissions of the Contractor (other than the specific enumerated categories triggering indemnification, such as breach of contract).

The indemnification extends to SMP and members of its Board. The City of Seattle is not directly indemnified. By contrast, often local governments would be covered directly as “indemnities” in other design-build contracts.

The DBEC does acknowledge, in Section 18.1.5, that SMP is indemnifying the City under the Transit Way Agreement and indemnifying other public bodies under other agreements, and states that the indemnities in Article 18 extend to the City and those other public bodies. However, this provision should be read in conjunction with Section 2.1.10 of the DBEC. That Section requires the Contractor to assume certain obligations to the City under the Transit Way Agreement, and then sets forth a long list of exclusions from the Contractor’s assumption of SMP obligations under that Agreement, including certain indemnifications. It is unclear exactly how Section 2.1.10 relates to the indemnifications under Section 18. This issue requires further investigation.

### **3.1.3 Contract Changes**

In a design-build or other construction contracts, the basic way the fixed price can be increased, or the schedule extended, is through change orders. Proper management of change orders is critical to controlling project costs.

The DBEC sets forth 13 circumstances that allow a Contractor-initiated change order for extension of the Completion Date and 20 circumstances that allow for an increase in the Contract Price.<sup>3</sup> This is probably a more extensive list than found in most design-build contracts,

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<sup>3</sup> In addition to the four major items discussed in the text, the Contract allows change orders for matters such as SMP caused delays, certain utility delays, City caused delays, changes in law, litigation orders, insurance premium increases, and economic price adjustments.

although some types of circumstances justifying a change are relatively typical. One rather unusual provision is that the Contractor is entitled to a change order if the insurance premium is greater than 120% of initial quote. Like other design-build and construction contracts, the DBEC also provides for owner directed change orders.

Four of the biggest risk areas that can result in a cost increase or approved delay under the DBEC, through issuance of change orders, are the following: 1) Force Majeure; 2) differing site conditions; 3) hazardous materials; and 4) governmental approvals. These are standard in most design-build contracts.

Force Majeure are events beyond the control of the Contractor, such as natural disasters. The Contract includes an extensive but somewhat standard listing of Force Majeure events. However, it does include third party strikes (such as strikes at ports, etc.), and some Force Majeure provisions exclude strikes. One unusual Force Majeure item is inclusion of the failure of a utility service that serves the Project during and after construction.

Another significant basis for a change order is differing site conditions. Differing site conditions are site conditions found during the Project that differ materially than those in the geotechnical reports or that would normally be found in similar areas. The DBEC includes acceptable provisions on this topic, with more detail than some other design-build contracts.

The third major change order category is Hazardous Materials. The Contract also has good provisions on this topic, with more detail than similar contracts. For example, the DBEC defines the types and amounts of contaminated soils expected to be removed by the Contractor within the agreed-upon Contract Price.

Finally, the DBEC allows change orders in connection with government approvals. “New” governmental approval requirements provide a basis for a change order. However, general delays in governmental approvals do not justify a change order for price or schedule (unless the delay is City or SMP-caused). In this area, the DBEC limits the availability of change orders to a greater extent than some other design-build-construct contracts.

In sum, the DBEC deals with these four major categories of changes in a quite reasonable fashion; the difficulty presented is not with those four, but rather with the numerous other categories included in the list of permissible changes. By contrast, the Las Vegas DBEC limits contractor changes to only four circumstances: 1) owner caused delays; 2) Force Majeure events; 3) differing site conditions; and 4) certain delays caused by utilities. However, from a contractor’s perspective, limiting the possibility or categories of change orders will simply result in a higher overall price, because the Contractor will feel that it needs to have extra “cushion” or contingency to deal with unforeseen events. As a result, construction and design-build contracts often include multiple categories of eligible contractor-initiated changes, although probably not as extensive as the list in the monorail DBEC.



### **3.1.4 Liquidated Damages, Liability Cap, and Warranties**

The DBEC provides liquidated damages of \$35,000 per day for not meeting the “substantial completion” date. This amount is slightly lower than most design build contracts. The DBEC also includes a penalty of \$17,500 per day for not meeting the final acceptance date. Final acceptance must occur within 120 days of substantial completion. This liquidated damage is often not included in design-build or construction contracts, on the theory that the agency/owner really controls when final completion occurs. The concepts of substantial and final completion are defined in detail in the DBEC.

Most construction and design-build contracts include some type of limitation on the Contractor’s overall financial liability to the public agency/owner. The DBEC includes such a limitation which establishes the Contractor’s total maximum liability to SMP, including liquidated damages. The cap in the DBEC (Article 17, Section 4) is \$250 million after substantial completion and before final acceptance, and \$200 million after final acceptance. This equals about 12½% of the Contract Price, which may be slightly on the low end of the range found in construction contracts.

The warranties provided in Article 11 of the DBEC appear to be consistent with industry standards. They include: 1) vehicles and switches: 16 months; and 2) everything else: 12 months. One possible omission is a fleet defect warranty which does not appear in Article 11. Fleet defect warranties require the Contractor to review and repair (if necessary) all vehicles upon the occurrence of the same defect in a specified percentage of the fleet. This type of warranty is particularly important for high technology vehicles.

### **3.1.5 Summary of Findings for the Design-Build-Equip Contract (DBEC)**

Detailed findings from our review of the Design-Build-Equip Contract were presented above. Overall, we found the DBEC to be a well-prepared contract that met industry standards, and was better than industry standards for some matters.

**Financial Exposure** – We reviewed three areas: 1) Insurance; 2) General Indemnification; and 3) Bonding.

- For insurance (Builder’s Risk, Workers Comp., General, Comprehensive/Professional Liability; several other coverages), in our opinion we found the contract to be adequate in the major areas, and is better than average for Comprehensive/Professional Liability. The City of Seattle is listed as an additional insured.
- For General Indemnification (Hold Harmless), the DBEC good in scope with industry standard or better, and has normal exclusions. The City of Seattle directly indemnified as to matters of Transit Way Agreement, but possibly with exclusions. This issue requires further analysis.

- In terms of Bonding, the DBEC has two tiers: 1) \$250 million through bond with back-up guarantee by Fluor; and 2) \$250 million for trains (\$205 million) and bridge work (\$45 million). Also provides a corporate guarantee from Fluor Corp. As a point of comparison, if this were a federally-funded project, the FTA would normally require a 100% performance bond equal to the value of the project (\$1.6 billion). A performance bond that large is difficult to obtain, so the manner in which this issue is addressed in the DBEC is probably adequate, especially since Fluor is such a large corporation. The City of Seattle is a dual obligee on the bonds, but its rights are limited to the cost to “teardown” the project and to repair/restore City property. City coverage is not enough to assure project completion.

**Price of Contract** – Price is \$1.6 billion including almost all costs, with a setting-date of October 18, 2005. Provisions are fairly standard, with one potential item of concern:

- Utility Relocation costs of \$67 million appear to not be included in contract price and does not appear to be capped – if allowance is exhausted, SMP must use contingency funds for cost overruns. Utility Relocation and Government Approval contingency fund is \$35 million for the entire project.

**Cost Increases and Approved Delays** – Four key areas that can result in cost increase or approved delay under the Contract, through issuance of change orders: 1) Force Majeure; 2) Differing Site Conditions; 3) Hazardous Material; and 4) Governmental Approvals. These are standard in most design-build contracts.

- For Force Majeure (delays beyond control of contractor, such as natural disasters), contract has fairly standard listing of Force Majeure events. Only unusual item is inclusion of the failure of a utility service that serves the project during and after construction (i.e., Cascadia could be given more time or a project cost increase through change order).
- In terms of Differing Site Conditions (site conditions that differ materially than those in geotechnical report or that would normally be found) and Hazardous Materials, the DBEC has good provisions, with more detail than similar contracts. For Government Approvals, the DBEC includes detail similar to other design-build contracts.

**Change Order Provisions** – The DBEC has approximately 12 items that allow a change order.

- The number of items that can initiate a change order are more than most design-build contracts, but not out of line. The change order exclusions are industry standard. The DBEC contains unusual provision that allows for a change order if contractor’s insurance premium is greater than 120% of initial quote.

**Penalties** – The DBEC has provisions for penalties of \$35,000 per day for not meeting “substantial completion” milestones, and \$17,500 per day for not meeting final completion date.

- The penalty for substantial completion is slightly lower than most DBOM contracts. The DBEC includes a “final completion” penalty that is usually not accepted by contractors, which provides lower risk to SMP.

**Warranties** – The warranty period for vehicles and switches are 16 months, and for everything else is 12 months

- We could not find a Fleet Defect warranty during our review. A fleet defect warranty is particularly important for new technology vehicles.

## **3.2 OPERATE AND MAINTAIN CONTRACT (OMC)**

This review of the Seattle Monorail Green Line Operate and Maintain Contract (O&M Contract or OMC) between the Seattle Monorail Project (SMP) and Cascadia Monorail Company, LLC (Contractor) will focus on the following four areas: 1) compensation and payment; 2) financial protection (specifically, insurance, bonding, and indemnification); 3) changes on pricing and scope (specifically, change orders); and 4) performance standards and liquidated damages.

### **3.2.1 Compensation and Payment**

**Base O&M Price** – One of the central issues in any transit operations and maintenance contract is the certainty or “fixed” nature of the annual price. In constructing a short-term or long-term operating budget for transit services, it is obviously critical to know, to the maxim extent feasible, what the annual operating costs will be. The following discussion focuses on the extent to which the O&M Contract has a “fixed price”.

The structure of the monorail O&M Contract is as follows: Under Article 7, the Contractor is paid a Base O&M price for operating the Baseline Service. The components making up the Base O&M price are set forth in Exhibit D to the Contract.<sup>4</sup> This Base O&M price is not really a firm fixed price; but rather is subject to adjustment under Article 8 and escalation under Article 9 of the Contract.

The adjustments to the price under Article 8 can occur on the basis of the following:

- Service level adjustments (i.e. changes in vehicle service miles).
- Changes directed by SMP.
- Contractor-initiated change Orders (discussed in more detail below).
- Increase in the Capital Asset Replacement Program (CARP) price.

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<sup>4</sup> Exhibit D has not been reviewed for purposes of this report.

In addition, the Base O&M Price and the CARP Price (discussed below) are subject to escalation under Article 9 of the Contract pursuant to an economic price index (using a formula based on labor and materials costs).

In transit operating agreements,<sup>5</sup> adjustments to the base contract price, or base rate, based on agency/owner directed service changes and escalation are fairly standard. In some contracts, the “out-year” rates are agreed upon in advance, so that the escalation is predetermined. However, the availability of Contractor initiated change orders as a basis for a price adjustment is less common, and some contracts have no provision authorizing contractor-initiated changes.

**Exclusions** – In addition to the adjustments and escalation of the Base O&M price described above, the O&M Contract provides that six cost items are not included in the Base Price, as follows:

- The Base Building Maintenance Service Price
- Power usage
- Certain premiums for bonds and insurance
- Certain costs of vandalism (above an annual cap of \$500,000)
- Costs of fare media
- The Capital Asset Replacement Program (CARP) price

Of these exclusions, it appears that only the Base Building Maintenance Price is a “known” number. It is set forth in Exhibit D, and is subject to escalation.

The amount payable for power usage is set forth in a formula described in Article 7, Section 2.6. The excess vandalism costs are paid by SMP to the extent they are “actual” and “reasonable”. The other three exclusions – premiums for bonds and insurance; payment for fare media; and the CARP price – are to be negotiated by the parties within 42 months after the Notice to Proceed. Basically, other than any initial estimates that may have been developed, almost all of these “excluded” costs are not clearly known at this time.

While (as noted) it is relatively standard practice to have the type of price adjustments and escalation provided in the O&M Contract (other than Contractor-initiated changes), it is far less common to have six “exclusions” – some of potentially significant dollar amounts – from the base O&M price. Simply stated, it is usually possible to look at most transit operating agreements and get a fairly clear picture of the annual cost. That does not appear to be true for the monorail O&M Contract. The net effect of the exclusions is that the monorail O&M price, particularly after the first few years, is not really known.

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<sup>5</sup> For purposes of this analysis, we reviewed and compared two large fixed route bus contracts, a major commuter rail operations agreement, and the Las Vegas Monorail O&M Contract. These contracts offer a representative sampling of typical approaches to transit operating agreements in the transit industry. (Since most transit operations are provided “in-house”, there are a limited number of fixed route contract examples.) General references herein to “transit operating agreements” reflect the terms and conditions in the contracts used for comparison purposes.

The Contractor and SMP may have concluded that the only way to structure the O&M cost was to leave these excluded items for the future, and this conclusion may have been reasonable. However, it would appear to be necessary for SMP to have sufficient operating reserves or contingencies to address a scenario in which operating costs exceed current O&M estimates.<sup>6</sup>

One concern that this presents is that operating funding limitations in the future will result in the need to make reductions in contract requirements in order to operate within a constrained budget. For example, if bonding and insurance costs exceed estimates, there will be pressure to reduce the level of these protections. If CARP costs exceed estimates,<sup>7</sup> there will be pressure to reduce or defer capital replacement activities, which could have critical negative impacts on long-term system viability. The fact that major cost items are left to future negotiation not only creates budget uncertainty, but it also sets the stage for SMP being forced to reduce contract requirements to fit future budget constraints.

Finally, if SMP has operating budget shortfalls in the future, who pays? If shortfalls threaten to cause reductions in service, who will be financially responsible? Even if the City has no legal obligation to provide a subsidy, will there be public demands that the City provide funding to keep the monorail in operation?

**Monthly Payments** – The Contractor is paid on a monthly basis using a 13-factor formula, set forth in Section 7.2. The formula is designed to roll all basic costs, service increases, change orders, and failures to meet performance standards into a single calculation, and if it works on a practical level, there could be significant advantages in terms of compensation management and payment. However, the formula is complicated, and it is critical that accounting and tracking systems be in place to assure that the calculations made are reliable, accurate, and acceptable to both the Contractor and SMP. In the absence of such systems, the formula could be a recipe for recurring disputes.

By contrast, transit operating agreements generally strive to have as simple a monthly payment and invoicing system as possible, relying either on a pro rata monthly payment of an annual fixed price or on a simple calculation of the number of service hours provided times a base and/or variable rate.

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<sup>6</sup> At the Federal level, the Federal Transit Administration will not approve a new starts project for funding unless there is a reliable O&M cost estimate for the new services, and stable and reliable funds are identified to pay those costs, including adequate contingencies to cover unanticipated costs over budget.

<sup>7</sup> Although capital replacement costs should not be overly significant in the first few years, the demand will certainly grow over time. Capital maintenance and replacement have been a major issue on “older” new starts such as BART and WMATA. The costs of adequate capital replacement programs is great – the recent Metro Matters Funding Agreement for WMATA has a budget of over \$3 billion for capital rehabilitation and replacement.

### **3.2.2 Financial Protection**

The following discussion will focus on three areas of financial protection: (A) insurance; (B) bonding; and (C) indemnification and risk of loss.

**Insurance** – The Contractor is required under Article 10 to provide the following insurance coverages: 1) railroad liability (similar to general comprehensive liability insurance); 2) excess railroad liability; 3) railroad protective liability; 4) workers’ compensation and employer’s liability; 5) auto liability; 6) comprehensive crime; and 7) pollution liability. In addition, either SMP or the Contractor may (but is not required to) have property insurance covering Project real and personal property.

The scope of insurance coverage provided is good, and the limits required seem reasonable for a project of this size. In fact, the range of required coverages appears broader than standard transit operating agreements.

In addition, the City is listed as an additional insured under Article 10 sections under Railroad (10.3.2.5 & 10.3.3) and auto (10.3.6) and pollution (10.3.8.2). This is positive in terms of financial protection for the city in that it provides a form of direct insurance coverage for the city under the named policies.

**Bonding** – The Contractor is required under Article 10 to provide and maintain a Payment and Performance Bond in accordance with Exhibit F. Exhibit F includes a form for a Payment and Performance Bond for the first three years of the O&M period in the amount of \$50,000,000. After this period, the Contractor is obligated to provide a replacement or renewal bond, or alternative security, in the amount of \$50,000,000. In addition to this Bond, Fluor Corporation has provided a corporate guarantee to SMP assuring payment and performance of all obligations of the O&M Contractor.

Exhibit F also includes a Dual Obligatee Rider making the City of Seattle an additional Obligatee on the Payment and Performance Bond. The City’s right to make demand on the Bond is limited to the obligations of the Contractor – related to the improvement, repair, or restoration of the City Rights-of-Way, City-Owned utilities, other City capital facilities and assets and Service Lines that connect and users to City-Owned Utilities. The City is not covered by the Fluor Corporate guarantee.

A few things are worth noting regarding the Payment and Performance Bond. First, Payment Bonds (which guarantee payments to subcontractors) and Performance Bonds (which guarantee performance or project completion, up to the stated amount) are usually separate bonds. (Federal and State law also often treat them as separate obligations.) In the event of some “call” on the Bond, it is not clear whether priority goes to unpaid subcontractors or to SMP to assure continued performance. Second, the amount of the Bond certainly would not cover completed operations for the O&M term; rather it looks like it would be sufficient to pay for slightly over

one year of operations and maintenance.<sup>8</sup> However, it should be noted that FTA does not require performance bonds on operating contracts (unlike construction, where there is a 100% bonding requirement). Moreover, as a matter of practice, performance bonds are not always included in operating agreements, and when used the bonds are normally not sufficient to cover multiple years of operation.

**Indemnification** – The Contractor agrees in Article 15 to indemnify and hold SMP harmless for claims, costs, and damages, including personal injury and property damage, in seven specified circumstances or events (see Article 15, Section 2.1). These include circumstances such as failure of the Contractor to perform its obligations under the Contract, Contractor release of Hazardous Materials, failure to comply with Environmental Laws or Government Rules, and “any other culpable act, culpable omission or misconduct of any Contractor – related entity.” The last category is significant in that it establishes the standard of liability that must exist before the indemnification obligation is triggered (in those circumstances that are not covered by one of the specific enumerated circumstances).

In general, this indemnification extends to SMP and its board members, agents, and employees, and does not extend directly to the City or other public bodies. However, under Section 15.2.4, the Contractor’s indemnification does apply to the City as to matters on which SMP has agreed to indemnify the City under the Transit Way Agreement. Accordingly, to the extent the City is indemnified by SMP, that indemnification is “picked up” by the Contractor. However, this provision must be read in conjunction with Section 2.11 of the Contract. That Section requires the Contractor to assume certain obligations and indemnifications owed by SMP to the City under the Transit Way Agreement, but then sets forth a long list of exclusions from the Contractor’s assumption of SMP obligations under that Agreement. It is unclear exactly how this relates to the indemnification requirements.

By using the “culpable”<sup>9</sup> standard in the indemnification section, the O&M Contract appears to rely on a higher standard of Contractor misconduct than that found in other transit operating agreements. Some bus operating agreements require “blanket” indemnification by the Contractor for claims and costs without regard to whether the Contractor engaged in any negligence or misconduct. Others agreements require indemnification for all actions of the Contractor that constitute a “negligent act or omission.” However, under Article 15 of the O&M contract, it appears that the Contractor is not required to indemnify SMP for mere negligent acts that cause loss or damage.

If the Contractor’s indemnification obligations are limited, this raises some concerns about the City’s exposure. For example:

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<sup>8</sup> Based on SMP OMC Pricing Estimate – 2011 – 2015.

<sup>9</sup> Black’s Law Dictionary defines “culpable” as involving the breach of a legal duty or the commission of a fault. It implies that the act or conduct spoken of is reprehensive or wrong but not that it involves malice or a guilty purpose. “Negligence” on the other hand, is the failure to use ordinary care, or as sometimes stated, the care a “reasonable person” would use under the circumstances presented.

- If there is a catastrophic monorail accident with significant personal injury and property damage, and the City and SMP are sued, what happens? If the Contractor were merely negligent, it could argue that its indemnity does not apply.
- Even if insurance coverage applies, who has financial responsibility if the coverage limits are exceeded, on an incident or aggregate basis? If the indemnification is not triggered, both SMP and the City could have financial exposure.

In addition, although the Contractor is required under Article 15 (as part of its indemnification duty) to provide a defense to claims or to pay for the defense, it is not clear that this obligation extends to the City as an “indemnified party”. Accordingly, the City could be required to pay for the defense of monorail-related litigation even if the plaintiffs do not ultimately prevail or if the loss is covered by insurance.

The indemnification provisions also need to be read in connection with Section 10.4, which addresses Risk of Loss. Section 10.4 states that SMP assumes risk of loss or damage to the Project with the exception of certain “distinct and several risks” enumerated in that section. Specifically, the Contractor assumes risk of claims by third parties for injury or damage arising from the Contractor’s failure to perform its obligations under the contract “or any other culpable act, culpable omission, or misconduct”. Again, risk of loss does not appear to be assumed by the Contractor if the injury or damage arises from Contractor acts or omissions that are “merely” negligent<sup>10</sup> – that risk of loss remains with SMP.

### **3.2.3 Changes in Pricing**

Under Article 8 of the O&M Contract, SMP has the authority to modify the requirements for the Work and to require Service Level adjustments. Section 8.1 provides a formula for the calculation of service level adjustments (based on incremental increases in the baseline vehicle miles operated) and Exhibit I provides rates for time and materials change orders. These provisions establish a reasonable process and methodology for SMP directed changes. Although these provisions clearly allow for O&M costs above the Base O&M Cost, the use of this authority is within the discretion of SMP, and (in theory at least) SMP would not initiate service changes or other modifications unless it had the financial capacity to handle the associated increased cost. In addition, transit operating agreements normally give the public agency or owner the right to direct service changes in the work.

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<sup>10</sup> By contrast, the O&M contract for the Las Vegas Monorail transfers risk of loss to the Contractor for claims by third parties that “arise out of or in connection with the performance of the Work,” without limiting such responsibility to either a “negligence” or a “culpability” standard.



However, the provisions in the O&M Contract (Section 8.3) that allow Contractor-initiated Change Orders are less common in transit operating agreements. Specifically, the Contractor is entitled to a Change Order for events such as the following:

- Force Majeure<sup>11</sup> events.
- Changes in law.
- Requirements materially different from those assumed by the Contractor in determining the Base O&M Price relating to Governmental Approvals or Third Party Agreements.
- Repairs/Replacements to property for which SMP bears the risk of loss.
- Certain insurance premium increases.

These provisions clearly create a potential for O&M cost increases, but more importantly cost increases that are not controlled by the SMP and that may or may not be within SMP's ability to pay.

By contrast, transit operating agreements generally do not include provisions establishing any entitlement to contractor-initiated change orders. Also, although Force Majeure clauses are regularly used in operating agreements, their purpose is normally to excuse performance that fails to meet contractual performance standards, rather than to provide a basis for additional compensation. Overall, the Contractor appears to be assuming less financial risk in the O&M Contract than would ordinarily be the case in transit operating agreements.

### **3.2.4 Performance Standards and Liquidated Damages**

Although Performance Standards are not strictly a financial or risk allocation issue, it is appropriate to consider how this topic is addressed in the O&M Contract because performance quality and reliability of service will inevitably have an impact on ridership, and thus on fare revenue.

Under Section 3.5 of the O&M Contract, the Contractor is required to perform operations and maintenance in a manner consistent with "industry standards". It is unclear (particularly given the uniqueness of monorail service) specifically what standard of care or duty this imposes. The best source for operations and maintenance technical requirements is Exhibit B, Operations and

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<sup>11</sup> The Force Majeure Clause applicable to the O&M Contract is fairly broad. It includes any earthquake, tsunami, hurricane or other natural disaster; any epidemic, blockade, rebellion, war, riot, act of terrorism, sabotage or civil commotion; the suspension, termination, interruption, denial or failure to obtain, non-renewal or amendment of any SMP Governmental Approval; any failure of utility service that serves the Project; any suspension of service required by police or any public official other than the SMP; any physical destruction or damage to the Project or any portion thereof from fire, lightning, explosion, flood, storm, or street traffic accident; any spill or release of Hazardous Materials by a third party at, near or on the Site which occurs after the Setting Date; any labor strike of a port, rail facility or other mode of transporting goods, equipment and material required for the maintenance or repair of the Project; any Litigation Order; and any vandalism requiring overhaul, rehabilitation, refurbishment, reconstruction or replacement of major components, equipment and facilities within the CARP to occur in a different year of the O&M Period than scheduled under the current CARP.

Maintenance Technical Requirements. Exhibit B provides detail on maintenance requirements for vehicles and facilities, but does not seem to have specific operations or performance standards such as schedule adherence, missed trips, etc.

The primary mechanism the O&M Contract uses to establish and enforce operating performance standards are the deductions from monthly compensation under Article 7. Specifically, there are deductions for (1) loss of availability of fare collection equipment; (2) failure to meet operating system availability; and (3) elevator and escalator downtime. These deductions are treated under Article 7 as liquidated damages.

In comparison with other operating agreements, this list of liquidated damages is rather limited. Typical provisions would often include liquidated damages for matters such as vehicle appearance, late vehicles or trains, ADA non-compliance, unavailable vehicles, deficient vehicle condition, station cleaning, uniforms/grooming, employee performance, late or inaccurate reports, etc. There can be debate as to the proper scope and amount of liquidated damages, but for most contracted transit systems it is critical to have clear and well defined operations performance standards and maintenance standards, and to have a good range of financial sanctions (liquidated damages) that cover all of the standards established. It is not clear that the O&M Contract meets that objective.

### **3.2.5 Summary of Findings for the Operate and Maintain Contract (OMC)**

Findings from our review of the Operate and Maintain Contract were presented above. Overall, we found the OMC to provide potentially less protection than the DBEC. The OMC meets many industry standards, but provides potential financial exposure to SMP, and possibly the City, because many of the future costs remain unknown. These costs include potential adjustments to the O&M price and specific contractor exclusions. Not knowing future costs presents risk, especially when the monorail is to be self-sufficient by 2020.

**Compensation and Payment** – Contract is for annual fixed amount is \$26.625 million (2005\$) with 2.5% inflator, for a term of five years, with two five-year options.

- The OMC includes base amount and allowable adjustments, including contractor-initiated change Orders. Contractor-initiated change orders are highly unusual in OMC contracts.
- The contract has provision for six exclusions. Price of three exclusions (premiums for bonds and insurance, fare media, and the Capital Asset Replacement Program (CARP) are to be negotiated within 42 months after operations. Having exclusions is unusual for an OMC. For example, if insurance goes up then there may be incentives to lower protections. If the price of the CARP goes up, then there may be incentive to defer maintenance.
- Monthly payments are calculated using a 13-factor formula that could be complicated and spawn disputes. Most OMC's strive for simple payment methods.

**Financial Protection** – We reviewed three areas: 1) Insurance; 2) Bonding; and 3) Indemnification.

- For insurance, the contract appears to be good in scope, limits are reasonable, and coverages are broader than most contracts. The City of Seattle is an additional insured.
- The OMC includes provisions for a \$50 million Payment and Performance bond. Fluor Corporation has provided a corporate guarantee to SMP assuring payment and performance of all obligations of the O&M Contractor. The OMC includes a Dual Obligatee Rider giving the City of Seattle an additional protection (although limited). The amount of the Payment and Performance bond would not cover completed operations for the O&M term. Inclusion of a performance bond provides added protection for SMP compared to other operating contracts, as performance bonds are not always included in operating agreements, and when used the bonds are normally not sufficient to cover multiple years of operation.
- The City of Seattle directly indemnified as to matters of Transit Way Agreement, but possibly with exclusions. This issue requires further analysis (15.2.4). Unlike the DBEC, the OMC uses the term “culpable” rather than “negligent”. Culpable is a higher standard. This provision shifts more risk to SMP (and possibly the City) and away from the contractor.

**Changes in Pricing** – The contract allows for contractor-initiated change orders for: 1) Force Majeure events; 2) Changes in law; 3) Requirements materially different from those assumed by the Contractor in determining the Base O&M Price relating to Governmental Approvals or Third Party Agreements; 4) Repairs/Replacements to property for which SMP bears the risk of loss; and 5) Certain insurance premium increases.

- The ability of the Contractor to initiated change orders as a basis for a price adjustment is not common, and some contracts have no provision authorizing contractor-initiated changes. Inclusion of the change order provision makes it difficult to estimate future costs and SMP has less control over its costs.

**Performance Standards and Liquidated Damages** – The OMC contains some maintenance standards, but we found no performance standards such as schedule adherence, missed trips, etc. The only enforcement for performance appears to be: 1) loss of availability of fare collection equipment; 2) failure to meet operating system availability; and 3) elevator and escalator downtime.

- There can be debate as to the proper scope and amount of liquidated damages, but for most contracted transit systems it is critical to have clear and well defined operations performance standards and maintenance standards, and to have a good range of financial sanctions (liquidated damages) that cover all of the standards established. It is not clear that the OMC meets that objective.

## **4.0 FUNDING/REVENUE ASSESSMENT**

The purpose of the funding/revenue assessment is to determine if SMP's funding estimates and assumptions are reasonable, and determine and/or confirm how much of each source will be available each year. We evaluated funding estimates in the three revenue categories: 1) Motor Vehicle Excise Tax (MVET); 2) Fare Revenue; and 3) Non-Farebox Operating and Other Revenue.

Our MVET evaluation would be relevant to any financial plan proposed by SMP. However, fare revenue is driven by ridership, which in turn is affected by system characteristics (e.g., length of system, operating speeds). Since the SMP Board did not adopt the financial plan and it is likely that assumptions affecting fare revenue will change, we did not evaluate annual fare revenue, but we did evaluate the assumptions and modeling approach used to estimate fare revenue. To the extent that comparable assumptions and approaches have been and/or will be the basis for ridership and revenue projections for a potentially shortened line, this analysis is still relevant.

### **4.1 MOTOR VEHICLE EXCISE TAX (MVET) ESTIMATES**

The objective of this part of the review is to check the reasonableness of the assumptions used by SMP by looking at historic annual MVET base amounts and growth rates, and comparing assumed future growth rates with those made by others. The comparison allowed us to evaluate a range of MVET revenue that would be available on an annual basis.

#### **4.1.1 MVET Funding for the Monorail**

In November 2002, Seattle voters passed the Seattle Citizen Petition No. 1 that created the Seattle Popular Monorail Authority (now known as the Seattle Monorail Project) and established the agency's authority to levy a Motor Vehicle Excise Tax to fund the monorail program. As noted in the Seattle Monorail Project's (SMP's) 2004 independent financial audit, the MVET would "pay (1) the costs of building the Green Line, (2) the costs of operating and maintaining the Green Line during an initial start up period, (3) the costs of the [SMP's] overhead, operations and reserve to provide for inflation over time, and (4) the costs of planning the [SMP's] Second Phase."<sup>12</sup> The legislation capped the MVET taxation rate at 1.4%, and also limited SMP to issuing no more than \$1.5 billion in debt to finance Phase I of the monorail project.<sup>13</sup>

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<sup>12</sup> Moss Adams, LLP, "Seattle Popular Monorail Authority dba Seattle Monorail Project Independent Auditor's Report and Financial Statements with Supplemental Information," December 31, 2003, p. 1.

<sup>13</sup> From Seattle Monorail Authority Seattle Citizen Petition #1 on November 5, 2002 ballot:  
Section 6. Funding for Phase I.

(a) The Seattle Popular Monorail Authority may levy and collect a special excise tax not to exceed 1.4 percent on the value of every motor vehicle owned by a resident of the Authority Area for the privilege of using a motor vehicle. The proceeds of such special excise tax shall be applied by the Seattle Popular Monorail Authority to pay all or a portion of the cost of Phase I, including without limitation all or a portion of the cost of any debt, including

The calculation of the MVET revenues is based on two primary factors: the MVET base and the annual growth rate. The MVET base can be defined as the total depreciated value of all non-exempt vehicles registered in Seattle. As evidenced by previous miscalculations, changes in the MVET base directly influence the SMP's receipts. MVET analyses by various consultants have shown that variances in the annual growth rates of the MVET base can also result in significant differences between anticipated and actual revenues. In general, overestimating growth rates earlier in the planning timeframe results in more significant total variances because any over-estimates compound over time.

#### **4.1.2 The Importance of MVET Estimates**

MVET is the only source of revenue other than short-term loans (anticipated to be repaid with MVET revenues) currently available to SMP for monorail project construction. As stated on the SMP website, [www.elevated.org](http://www.elevated.org), "The SMP is funded by a motor vehicle excise tax (MVET)."<sup>14</sup> The anticipated complete dependence on MVET revenue through the end of the construction period necessarily makes the SMP financial plan highly sensitive to changes in MVET receipts. As noted by Washington State Auditor Brian Sonntag, "The accuracy of the Authority's MVET projections is critical to establishing a realistic project scope and financing plan."<sup>15</sup>

It is not within the scope of this analysis to determine whether or not an MVET base estimate or growth rate forecast is correct. Rather, this report includes analysis of the financial impacts to SMP's Cash Flow Forecast resulting from the use of a particular base or forecast. Given the uncertainty surrounding the various forecasts and the tremendous influence of the MVET growth rates on the Cash Flow Forecast, the use of a more conservative forecast may be prudent.

#### **Cash Flow Forecast is Sensitive to Changes in MVET Base and Growth Rate Estimates –**

Though the numerical difference in growth rate percentages may seem small, the effects of these differences for the SMP financial plan can be very significant. For example, a reduction of the average growth rate by 0.1 percent results in a loss of nearly \$319 million over a 45-year planning horizon. This is particularly true for the near term estimates, as the effects of the growth rates are compounded over the duration of the Cash Flow Forecast. For example, if the assumed

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but not limited to principal and interest payments and financing costs, issued to pay some or all of such Phase I costs. ...

(c) The Seattle Popular Monorail Authority shall not, without further voter approval, issue more than \$1.5 billion (in 2000 dollars) principal amount of debt to finance Phase I costs (the "Bonding Limit"). ... Furthermore, the Seattle Popular Monorail Authority shall not, without further voter approval, use revenues from the special excise tax to pay non-capitalizable costs of operating or maintaining Phase I after 2020 or to pay all or a portion of any debt issued after 2020 to pay non-capitalizable costs of operating or maintaining Phase I.

<sup>14</sup> Seattle Monorail Project, "About the Project, Funding" <http://www.elevated.org/project/funding/>, accessed October 12, 2004.

<sup>15</sup> Brian Sonntag, Washington State Auditor, *Accountability Audit Report: Seattle Popular Monorail Authority*, Report No. 69440, August 17, 2005, p. 2.

2.5% reduction in the MVET evasion rates in 2006 is not realized, MVET revenues would be reduced by \$240.6 million over 45 years.<sup>16</sup>

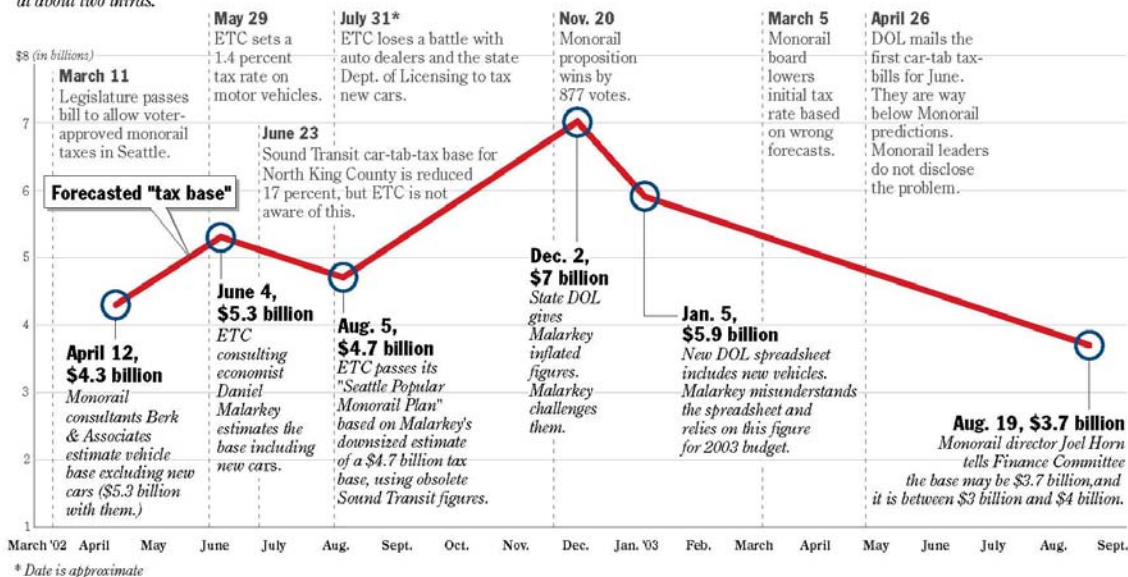
**MVET Revenues Lower than Projected** – At the time of the November 2002 election that resulted in the creation of SMP, the MVET base was assumed to be approximately \$4.5 billion.<sup>17</sup> In August 2003, after SMP's MVET receipts were lower than anticipated, SMP staff revised the MVET base estimate to a range between \$3 and \$4 billion.<sup>18</sup> As a result of this overstated MVET base, revenues to SMP were 20 to 30 percent lower than anticipated under the authorizing legislation.<sup>19</sup>

**MVET Base has Proved Difficult to Calculate** – Over time, economists have estimated the value of the taxable vehicle fleet in Seattle, or the MVET base. The estimate of the base prepared by ECONorthwest and used in the SMP Cash Flow Forecast of June 20, 2005 is \$3.283 billion.

The Seattle Times summarized the various estimates provided between March 2002 and August 2003.<sup>20</sup>

### The elusive car-tab tax

*The Seattle Monorail Project, and its predecessor, the Elevated Transportation Co., missed the mark in forecasting the "tax base" of motor vehicles in Seattle – which determines how much money can be collected by the new car-tab tax for monorail. Since the tax started in June, actual income has been at about two thirds.*



<sup>16</sup> SMP Cash Flow Forecast of June 20, 2005 includes reduction in evasion of 2.5% in 2006. Jonathan Buchter, Director of Finance and Administration, "Memorandum to File: Seattle Monorail Project Cash Flow Forecast – MVET Revenue," June 20, 2005, p. 5.

<sup>17</sup> Cambridge Systematics, *Summary of Findings Regarding the Calculation of the Monorail Motor Vehicle Excise Tax Base*, November 2003, P. A-7. Tom Weeks, Member, Seattle Monorail Project Board of Directors, Finance Committee Meeting Minutes, August 21, 2003, p. 3.

<sup>18</sup> Joel Horn, Executive Director, Seattle Monorail Project, Finance Committee Meeting Minutes, August 21, 2003, p. 3.

<sup>19</sup> Joel Horn, Executive Director, Seattle Monorail Project, Finance Committee Meeting Minutes, August 21, 2003, p. 3.

<sup>20</sup> Mike Lindblom, *Seattle Times*, "The Elusive Car-Tab Tax," September 11, 2003.

During this timeframe, the estimate varied between \$7 billion and \$3.7 billion. In the last two years, the estimate has declined from \$3.7 billion to \$3.283 billion, the amount included in the SMP Cash Flow Forecast used in our analysis. This is a change of 11 percent.

**Growth Rate Difficult to Project** -- In addition to estimating the MVET base amount, the SMP Cash Flow Forecast uses future growth rates to determine annual MVET revenues. Economists use several variables in different combinations to develop the forecasts, with the primary elements being the number of vehicles and their average value.<sup>21</sup> The variables that are used to determine the vehicle fleet size and value are population size and age, per capita income, number of households, household size, household income, labor force participation, unemployment, and inflation for both vehicles and general prices.<sup>22</sup> Different economists use different combinations of these data sources and different methodologies to develop their estimates.

In 2003, a panel of experts reviewed the methodology employed by ECONorthwest to develop the MVET forecasts. The reviewers found that the forecast methodology is reasonable, and that the “forecast uses methods and data sources to accommodate the unique geography of the Monorail MVET area.”<sup>23</sup> The data sources used to develop the forecast appear to be correct, with the potential exception of data anomalies in 1990 and 1991 resulting from a change in Washington State’s methodology for calculating the MVET.<sup>24</sup>

More recently, Dick Conway & Associates, economists who forecast the MVET base for the Puget Sound Regional Council (PSRC), Sound Transit and the Regional Transportation Investment District (RTID), have analyzed the MVET forecast prepared by ECONorthwest for SMP and concluded that the 6.1 percent average annual growth rate “is unreasonably high.”<sup>25</sup> Conway suggests that “ECONorthwest should reduce their forecast growth rate for the nominal Seattle motor vehicle excise tax base by at least one percentage point.”<sup>26</sup>

Economists have provided several different growth rate forecasts for the MVET. These range from 2.7 percent<sup>27</sup> to 9.4 percent<sup>28</sup> and form the lower and upper bounds used by ECONorthwest to estimate MVET revenues. The validity of these forecasts is subject to much debate.

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<sup>21</sup> Dick Conway, Remarks to Seattle Chamber of Commerce, September 8, 2005.

<sup>22</sup> Dick Conway, Remarks to Seattle Chamber of Commerce, September 8, 2005 and ECONorthwest, *The Tax Base of the Seattle Monorail Project: A Projection of Motor Vehicle Excise Tax Revenues*, May 2005, p. ii.

<sup>23</sup> Dick Conway, Principal of Dick Conway & Associates; ChangMook Sohn, Executive Director of Office of the Forecast Council; Dwight Dively, Director of Finance of City of Seattle; and Paul Sommers, Senior Research Fellow of Evans School of Public Affairs; letter to Sue Secker, Seattle Monorail Project, December 16, 2003.

<sup>24</sup> Seattle Department of Finance, “Latest Issue with SMP Revenue Forecast,” September 23, 2005.

<sup>25</sup> Richard S. Conway Jr., “Open Letter to the Seattle Monorail Project Board of Directors,” October 11, 2005, p. 2.

<sup>26</sup> Dick Conway, “Seattle Motor Vehicle Excise Tax Base Forecast: Methodological Note,” September 14, 2005, edited October 7, 2005, p. 7.

<sup>27</sup> ECONorthwest, *The Tax Base of the Seattle Monorail Project: A Projection of Motor Vehicle Excise Tax Revenues*, May 2005, p. 23, Lower Bound MVET Base and Revenues, Annual Growth Rate of MVET Base for 2005.

<sup>28</sup> ECONorthwest, *The Tax Base of the Seattle Monorail Project: A Projection of Motor Vehicle Excise Tax Revenues*, May 2005, p. 24, Upper Bound MVET Base and Revenues, Annual Growth Rate of MVET Base for 2016.

Examples of the issues that have been raised in the debate include the validity of data sources, projections for population growth in King County and Seattle from historical trends versus regional planning documents, the relative growth rates between the Puget Sound region and Seattle, vehicle ownership rates, and inflation rates.<sup>29</sup>

A key concern that has been raised involves the relationships between the demographic forecasts for Seattle, King County and the Puget Sound region. The forecasts prepared by the Puget Sound Regional Council that are the basis of the MVET projections used by SMP assume that population growth rate in Seattle will be the same as the growth rate in King County. Other economists' projections use a more conservative growth rate for the City of Seattle. As Dick Conway has noted "In my opinion, PSRC's projected growth rate for Seattle is unreasonable, since the city has never grown as fast as the county, except possibly in the 1800s when Seattle was first settled."<sup>30</sup>

One of the primary differences in the ECONorthwest forecast and its lower bound is the "trend adjustment factor", a technical element of the forecast methodology that "accounts for changes in the value of the vehicle fleet not explained by growth in the *real* value of the fleet and general price inflation."<sup>31</sup> For the MVET forecast used in the SMP Cash Flow Forecast, "the Trend Adjustment Factor begins at 1.5 in 2002 and trends downward logarithmically to 1.4 by 2030."<sup>32</sup>

As early as November 2003, the value of the trend adjustment factor has been noted as an issue of concern. In reference to the trend adjustment factor, the panel of experts who reviewed the ECONorthwest forecast methodology "agreed that the historic tendency for the value of the motor vehicle fleet to rise faster than inflation (all other factors held constant) will likely moderate in the years ahead. The forecast therefore includes an assumption that the nominal increase in vehicle value relative to inflation (other factors held constant) will trend down over time, and reach 1.0 at the low end of the forecast range."<sup>33</sup> As one member of the panel summarized the issue, "While the authors' estimate of a Trend Adjustment Factor of 1.5 may be "conservative" in relation to the historical values in the model, it is less clear that the value is conservative going forward. ECONorthwest may want to reconsider this value."<sup>34</sup> Another member of the panel wrote, "I think it would be prudent to re-run the models with significantly

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<sup>29</sup> Seattle Department of Finance, "Latest Issue with SMP Revenue Forecast," September 23, 2005 and Dick Conway, Remarks to Seattle Chamber of Commerce, September 8, 2005.

<sup>30</sup> Dick Conway, Remarks to Seattle Chamber of Commerce, September 8, 2005, p. 3.

<sup>31</sup> Examples include "excess inflation in the price of new vehicles and taste and preference trends on the part of vehicle owners." ECONorthwest, *The Tax Base of the Seattle Monorail Project: A Projection of Motor Vehicle Excise Tax Revenues*, May 2005, p. 40.

<sup>32</sup> ECONorthwest, *The Tax Base of the Seattle Monorail Project: A Projection of Motor Vehicle Excise Tax Revenues*, May 2005, p. 16.

<sup>33</sup> Dick Conway, Principal of Dick Conway & Associates; ChangMook Sohn, Executive Director of Office of the Forecast Council; Dwight Dively, Director of Finance of City of Seattle; and Paul Sommers, Senior Research Fellow of Evans School of Public Affairs; letter to Sue Secker, Seattle Monorail Project, December 16, 2003.

<sup>34</sup> ChangMook Sohn, "Comments on 'The Tax Base of the Seattle Monorail Project' by ECONorthwest."



lower trend adjustment factors (lower than the 1.3 you used) to get a sense of the sensitivity to this variable.”<sup>35</sup>

As recently as September 2005, discrepancies in data used to develop the trend adjustment factor have come to light. In these more recent discussions, it has become clear that the source data for the ECONorthwest forecast includes an anomaly related to how the State of Washington calculated the MVET in 1990 and 1991. As noted by Seattle Department of Finance staff, “ECONorthwest has reviewed this analysis and agrees that the MVET values in the early 1990s are problematic. Their response was to eliminate the 1990 and 1991 data and to analyze the growth rate over the remainder of the decade.”<sup>36</sup>

Seattle Department of Finance staff argues that this discrepancy could change the average MVET growth rate from 6.1 percent per year to approximately 5 percent. This could result in a loss of approximately \$4.2 billion over the life of the Cash Flow Forecast.<sup>37</sup> In addition to this change, it appears that ECONorthwest has decided to adjust the inflation rate used in its forecast as well. This inflation adjustment would lessen the effects of the data error, thereby minimizing any changes in the resulting MVET revenue forecast. As noted by Seattle Department of Finance staff, “Even if their offsetting inflation correction is accepted, this means that they have lost any conservatism in their future trend adjustment factor. If the inflation change is rejected, their trend adjustment factor far overstates the expected future MVET.”<sup>38</sup>

Given the uncertainty of the MVET growth rate forecasts, several sensitivity tests were performed on the Cash Flow Forecast by altering one or more of the forecast elements that have been called into question.

**Plan Assumes Mid-Range Growth Estimate Rather than Lower Bound**– The MVET forecast prepared by ECONorthwest includes upper and lower bounds for the MVET growth rate which delineate a 95% confidence interval for the estimate. As noted by ECONorthwest, “By accounting for the inherent variability of the economic and demographic factors that affect the value of the MVET base, as well as the variability in the trend adjustment factor, we believe the forecast error bands encompass, with approximately 95% confidence, the true growth path of the MVET base. That is, based on the historic variability of the factors identified as explaining MVET base growth, there is an approximately 95% likelihood that the actual MVET growth will occur within the interval (of the upper and lower error bands on Monorail MVET Base Forecast).”<sup>39</sup>

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<sup>35</sup> Dwight Dively, “Comments on ECONorthwest MVET Report,” November 18, 2003.

<sup>36</sup> Seattle Department of Finance, “Latest Issue with SMP Revenue Forecast,” September 23, 2005.

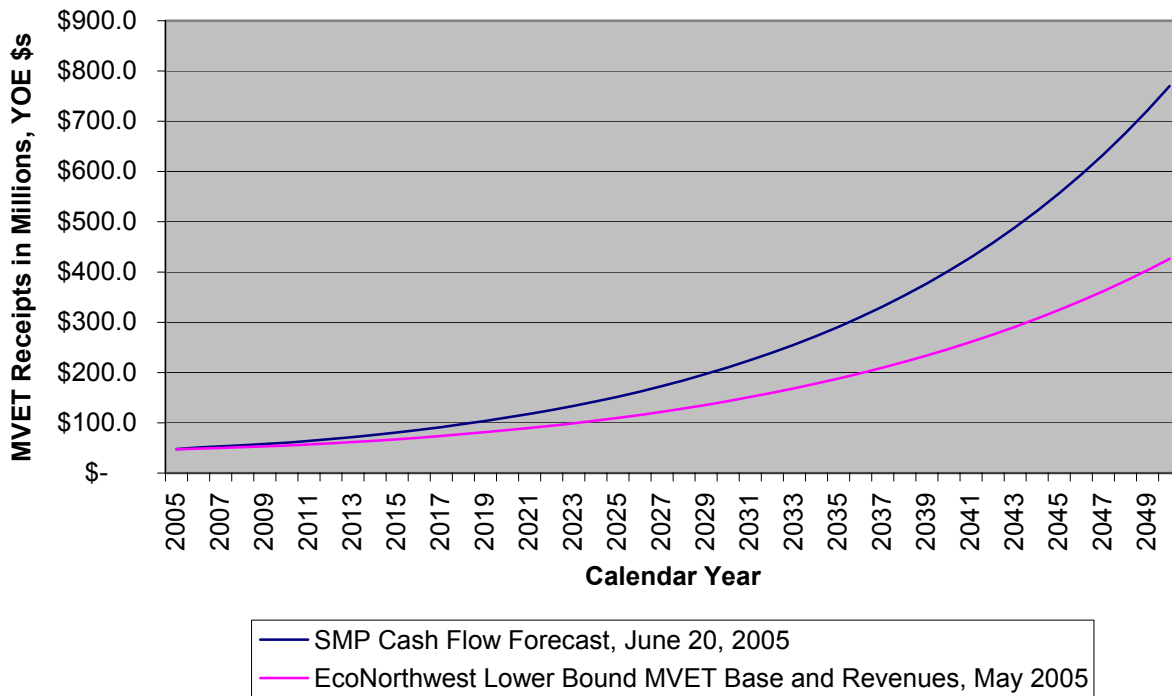
<sup>37</sup> Financial analysis based on using ECONorthwest’s estimate of “Lower Bound MVET Base and Revenues” which has an average annual growth rate of 5%. ECONorthwest, *The Tax Base of the Seattle Monorail Project: A Projection of Motor Vehicle Excise Tax Revenues*, May 2005, p. 23.

<sup>38</sup> Seattle Department of Finance, “Latest Issue with SMP Revenue Forecast,” September 23, 2005.

<sup>39</sup> ECONorthwest, *The Tax Base of the Seattle Monorail Project: A Projection of Motor Vehicle Excise Tax Revenues*, May 2005, p. 25.

The forecast represents a range of possible values and illustrates the real uncertainty that exists in projecting future growth rates. In this context, relying on an estimate within the lower range of the forecast range would reduce the chance for overstating the future revenues available to the SMP project. As shown in the following graph, using the lower bound estimate from ECONorthwest results in \$4.2 billion less MVET revenue over the 45-year cash flow period than shown in the June 20, 2005 Cash Flow Forecast.<sup>40</sup> While the actual growth rate may not be as low as the lower bound of the estimate, the financial consequences of a lower growth rate are significant. If MVET revenues were to come in lower than the SMP Cash Flow Forecast estimate, SMP would face increasing debt needs during the construction period and/or challenges in meeting a debt repayment plan.

### MVET Receipt Forecasts



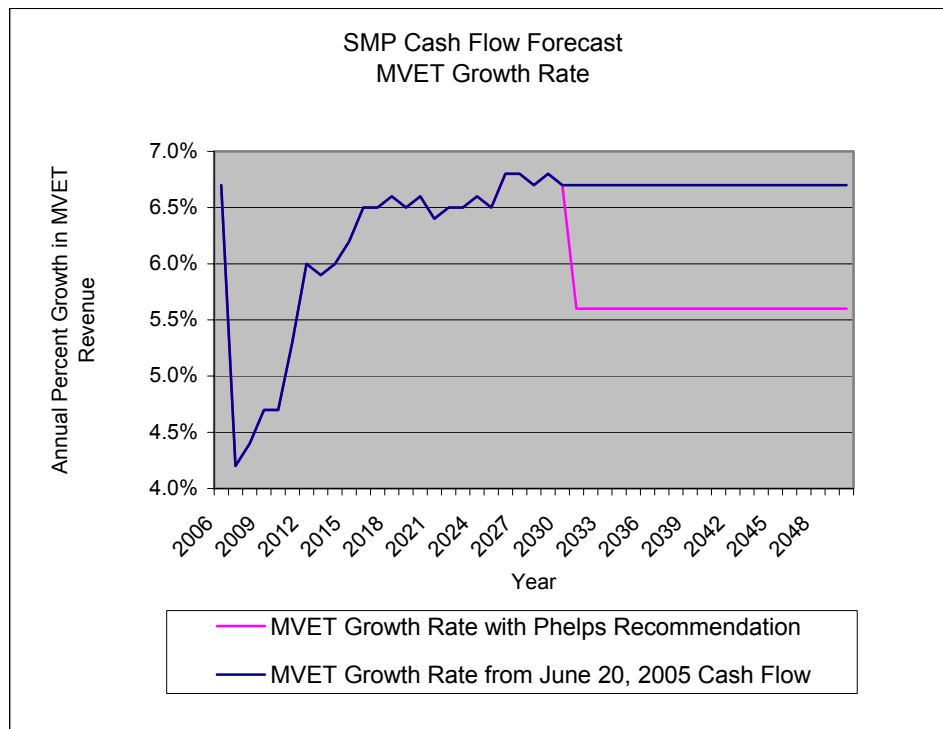
**Faster Growth in Outer Years** – Financial forecasting tends to be more difficult and imprecise when looking further out in time. For example, it tends to be more difficult to project sales tax growth rates in 2030 than in 2006. As a result of this increasing uncertainty, many financial planners use more conservative projections further out in time.

SMP's June 20, 2005 Cash Flow Forecast assumes faster growth in the outer years, particularly after the last year of the ECONorthwest forecast in 2030. The Cash Flow shows the MVET

<sup>40</sup> For the lower bound analysis, after 2030, the last year of ECONorthwest's forecast, the annual growth rate is assumed to be the same as the last year of the forecast. This rate of 5.6% is the same rate that Kevin Phelps recommended in September 2005, as discussed later in this report.

growth rate from the last year of forecast (2030) as 6.7 percent through the next 20 years to the end of the cash flow in 2050. There does not appear to be any additional basis for forecasting a continued annual growth rate of 6.7 percent. As a result of a financial policy analysis sponsored by SMP, for the years after 2030, analyst Kevin Phelps recommended “a more conservative 5.6% MVET growth rate over time, simply because there is not forecast available for the years after 2030.”<sup>41</sup> The lower recommended growth rate is shown in the table below. Applying this rate of 5.6 percent from 2031 to 2050 would result in approximately \$1.08 billion less MVET revenue over the 45-year cash flow.

The recommendation to reduce the growth rate in the years after 2030 is a solid one. However, the ECONorthwest forecast from 2005 to 2030 projects generally increasing growth rates over time. As shown in the table below, the growth rates of the later years of the forecast are generally higher than the growth rates of many of the earlier years. For example, the average growth rate in the first ten years of the forecast is approximately 5.4 percent. The subsequent ten year period averages 6.5 percent annual growth. The average annual growth rate increases to 6.7 percent for the last six years of the forecast.



Given the increasing uncertainty about the growth rates further out in time the ECONorthwest’s trend of rising growth rates may result in overstated revenues over the life of the financial plan. Accurate estimations of the MVET base and annual growth rates will result in more reliable

<sup>41</sup> Kristina Hill, Acting Chair, SMP Board of Directors, “Independent Monorail Reviewers Report,” September 7, 2005.

revenue estimates. In practice, however, developing accurate estimates can be very challenging. Applying relatively conservative assumptions to calculate estimates could compensate for some of the various uncertainties that have been identified.

### **4.1.3 Summary of MVET Analysis**

The analysis of SMP's MVET revenue estimates indicate potentially significant risk to the financial viability of the monorail operations. Actual MVET revenues have been lower than originally estimated, and the base and growth rates have been the subject of debate among area economists. MVET is the only source of revenue other than short-term loans (anticipated to be repaid with MVET revenues) currently available to SMP for monorail project construction. The near complete dependence on MVET revenues through the end of the construction period creates high risk to SMP and possibly the City.

#### **Cash Flow Forecast is Sensitive to Changes in MVET Base and Growth Rate Estimates –**

Though the numerical difference in growth rate percentages may seem small, the effects of these differences for the SMP financial plan can be very significant.

- Reduction in average growth rate of 0.1% results in a loss of \$319 million over 45 years.

**MVET Revenues Lower than Projected** – In August 2003, after SMP's MVET receipts were lower than anticipated, SMP staff revised the MVET base estimate. The decline in receipts can be partially attributed to the difficulty in calculating the MVET base and growth rates. Lower MVET revenues would diminish increase SMP's debt requirements during the construction period and/or create difficulties in meeting a debt repayment plan.

- MVET estimates in November 2002 were 20%-30% higher than August 2003.
- Between March 2002 and August 2003, the MVET base estimate varied between \$7 billion and \$3.7 billion. In the last two years, the estimate has declined from \$3.7 billion to \$3.283 billion.

**Variations in MVET Forecast Assumptions** – Economists have provided several different base and growth rate forecasts for the MVET. SMP uses forecasts that were made by ECONorthwest.

- The Seattle Department of Finance staff argues that the MVET average growth rate should be changed from 6.1 percent per year to approximately 5 percent. A 5% average annual growth versus 6.1% average annual growth results in a decrease of \$4.2 billion over the life of the forecast.
- The SMP Cash Flow Forecast uses an assumed annual growth rate of 6.7% from 2030 to 2050, which matches the growth rate from the last year of the ECONorthwest forecast, although there does not appear to be any additional basis for forecasting a continued annual growth rate of 6.7 percent. Using a more conservative growth rate of 5.6% in

outer years results in \$1.08 billion less MVET revenue over the 45 year cash flow. SMP has addressed this concern.

- Financial forecasting tends to be more difficult and imprecise when looking further out in time. As a result of this increasing uncertainty, many financial planners use more conservative projections further out in time. However, the forecast prepared by ECONorthwest that was included in the SMP Cash Flow Forecast projects higher growth rates in the later years of the planning horizon.

## **4.2 FARE REVENUE AND RIDERSHIP ESTIMATES**

The objective of this part of the review is to analyze fare revenue assumptions and estimates in the context of the monorail Cash Flow Forecast. Ridership and fare policy drive fare revenue, and fare revenue will be the primary source of the funding required for operations and maintenance (O&M), especially beginning in 2020 when monorail operations are required to become self-sufficient. The legislation that created the SMP specified that, starting in 2020, MVET revenues cannot be used to subsidize operations, so all of the operating costs must be covered by fares and other operating revenues.

The ridership forecasts used for SMP's Cash Flow Forecast were estimated using a travel demand model (ridership model) developed by the consulting firm Cambridge Systematics (CSI) for the City of Seattle Department of Transportation (SDOT). The travel demand model was used to estimate monorail ridership for 2<sup>nd</sup> Phase Planning for SMP, which includes the Green Line among other planned monorail lines. The ridership model alone was not used to estimate fare revenue for the Green Line, but fare policy assumptions (e.g., single adult fare, average fare, transfer policies, etc.) were included in the model to assist with estimating ridership (e.g., higher transit fares on one system would cause people to drive or use a lower-cost transit alternative). The resulting ridership forecast was then used in SMP's Cash Flow Forecast to estimate fare revenue.

Our review included assumptions regarding fare policy used in both the travel demand model and Cash Flow Forecast, such as the actual cash fare, average fare (which considers discount factors for seniors, students, passes, etc.), transfer policies, and the "ride free" zone. In evaluating the fare revenue estimates, we reviewed the ridership forecasts and associated fare assumptions to determine if they were consistent and reasonable when compared with other transit operators in the region, particularly King County Metro (KCM or Metro). We then compared the assumptions used in the travel demand model against the assumptions contained in SMP's Cash Flow Forecast. In theory, all data should be consistent: the travel demand model assumptions should reflect the best available transit operator data; and the SMP Cash Flow Forecast should use assumptions consistent with the travel demand model.

## 4.2.1 Fare and Fare Policy Assumptions

Our analysis included an assessment of the consistency and reasonableness of the fare and fare policy assumptions. Table 4.1 shows the fare assumptions from the ridership model, SMP cash flow, and King County Metro.

<b>Table 4.1</b>						
<b>Fare and Fare Policy Assumptions</b>						
<b>Fare Category</b>	<b>CSI Ridership Model<sup>1</sup></b>		<b>SMP Cash Flow<sup>2</sup></b>		<b>King County Metro<sup>3</sup></b>	
	<b>Peak</b>	<b>Off-peak</b>	<b>Peak</b>	<b>Off-peak</b>	<b>Peak</b>	<b>Off-peak</b>
Base Adult Fare	\$1.25 <sup>4</sup>	\$1.00 <sup>5</sup>	\$1.75	\$1.50	\$1.50	\$1.25
Base Youth Fare	\$0.50	\$0.50	\$1.00	\$1.00	\$0.50	\$0.50
Base Senior Fare	\$0.25	\$0.25	\$1.00	\$1.00	\$0.25	\$0.25
Average Fare <sup>5</sup>	\$1.01	\$0.87	N/A	N/A	\$1.01	\$0.76
% Peak Riders	61.0%	39.0%	76.7%	23.3%	N/A	N/A
Transfer Fare	N/A		57% to 100%		50% of Base	
% Transfers	59%		51%		N/A	
Ride Free Area	Yes		No		Yes	

NOTES:

N/A – Not Applicable or Not Available.

1. Cambridge Systematics with Parametrics, *Seattle Monorail Project 2<sup>nd</sup> Phase Planning Ridership Forecasting Study Final Report*, May 2005.

2. Seattle Monorail Project, "Fare Revenues.xls", June 20, 2005.

3. Various documents.

4. CSI ridership model fares are in year 2000 base dollars.

5. Average fare per linked trip (regardless of transfers). A linked trip can be composed of one or more boardings.

**Base and Average Fares** – The ridership model uses the standard fare assumptions from the Puget Sound Regional Council (PSRC) regional model. The Cambridge Systematics ridership report<sup>42</sup> cites single-zone fares of \$1.25 peak and \$1.00 off-peak (in year 2000 dollars, according to subsequent correspondence from CSI). Single-zone fares apply to the entire Green Line, except for the downtown Ride Free Area. The model uses average fares that reflect the use of passes: \$1.01 peak and \$0.87 off-peak. The actual single-zone fares in 2005 are \$1.50 peak and \$1.25 off-peak. King County Metro has calculated average fares, reflecting passes and discounts for youths and seniors; the average peak fare of \$1.01 is consistent with the ridership model assumption. However, KCM's off-peak figure of \$0.76 is lower than the ridership model assumption of \$0.87. The ridership model operates in real 2000 dollars, which implies that fare increases would occur at a rate equal to the overall inflation rate.

SMP's Cash Flow Forecast starts with the assumption of a fare increase in 2005 by King County Metro to \$1.75 peak and \$1.50 off-peak. This increase in regular fares has been discussed internally by Metro, but has not been approved. It will probably not be implemented until 2006. However, SMP also assumes very large increases in youth and senior fares – from \$0.50 and \$0.25, respectively to \$1.00. These are not consistent with Metro's plans, which would limit increases to \$0.25 for these groups.

<sup>42</sup> Cambridge Systematics with Parametrics, *Seattle Monorail Project 2<sup>nd</sup> Phase Planning Ridership Forecasting Study Final Report*, May 2005.

Since youth and senior riders account for about one-third of all riders, the revenue impact would be significant. If SMP decides to charge higher youth and senior fares than Metro, it is likely to be controversial. If SMP succeeds in charging higher fares for these groups, then ridership will be adversely affected, since the ridership model assumes no change in the existing fare discounts, and these groups will be sensitive to fare increases.

The Cash Flow Forecast applies an inflation factor to the fare revenue in each year, which is consistent with the ridership model assumption. However, the Cash Flow Forecast also applies two additional real fare increases of \$0.25 in 2015 and 2020 which are not included in the ridership model. Furthermore, each \$0.25 increase is applied to the *average* fare; this implies an increase in the peak cash fare of about \$0.50, using King County Metro's current ratio between average and full fares. Therefore the peak cash fare for the monorail in 2020 would be about \$2.75 in today's dollars. The fare increases are approximately equivalent to a 55% real increase from the assumed SMP adult peak fare of \$1.75; an 80% real increase from the current KCM peak fare of \$1.50; and a 120% real increase over the \$1.25 peak fare assumed in the ridership model.

When asked about this inconsistency, SMP staff cited the higher quality of monorail service as justification for the higher fare compared to buses. There is some validity to this. However, the ridership model explicitly accounts for most of the higher quality features: faster travel times and shorter headways than competing bus routes. The other significant advantage of monorail – more dependable travel times compared to bus times, which have high variability due to congestion – is difficult to quantify. However, it is doubtful that it would be sufficient to offset the negative impact of significantly higher real fares.

**Fare Revenue Distribution Among Fare Categories** -- In the Cash Flow Forecast an average fare per boarding is calculated based on the assumptions concerning the number of transfers and the distribution of passengers among various fare categories. For the assumed peak cash fare of \$1.75, the calculated average fare per boarding is \$1.12 (bottom portion of first page of SMP's fare revenue worksheet).<sup>43</sup>

The Cash Flow Forecast cites King County Metro data from 1999 concerning relative proportions of fare types: peak/off-peak, cash/pass, youth, and senior. For example, the assumed proportion of peak riders is 76.7%. However, the CSI ridership forecast projects that 61% of Green Line riders would be peak riders. Since peak fares are higher than off-peak fares, use of the 76% figure results in an over-estimation of fare revenues and the average fare per boarding used in the Cash Flow Forecast is likely overstated.

**Transfer Policy** – In the ridership model, fares are applied to complete (linked) trips between an origin and destination, regardless of the number of transfers that may be required. This reflects the free transfer policy of Metro, and supports the reciprocal transfer policy between Metro and other transit operators, including Sound Transit (under the current inter-agency agreement among

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<sup>43</sup> Seattle Monorail Project, "Fare Revenues.xls", June 20, 2005.

the transit agencies in the region, each transit agency is compensated for transfers from other systems). A June 20, 2005 memo to file<sup>44</sup> from SMP states that for passengers transferring from another mode to the Green Line, SMP would receive half of the fare revenue. This is consistent with the reciprocal transfer policy among regional transit operators. In other words, the average peak fare assumed in the ridership model is \$1.01 for a linked single-zone trip, regardless of the number of transfers. However, in the fare revenue worksheet, there are two apparent errors in the application of this assumption:

- Contrary to the statement in the memo, the worksheet assumes that SMP would receive more than half of the revenue; the assumed proportions range from 57% to 100%. For example, SMP counts \$1.00 in revenue from the peak fare of \$1.75, and counts the entire \$1.00 fare for youth and senior fares (as noted above, the \$1.00 youth/senior fare is probably too high to begin with). If SMP had correctly applied the assumption of 50% of the fare for all fare categories, it would result in a significant reduction in fare revenue. On the other hand, if SMP intends to charge an additional fee for transferring, then the ridership forecast would have to be adjusted downward. In addition, some of the decisions regarding truncation of bus routes might be reconsidered by KCM if the resulting bus-to-monorail trips would have higher fares than a direct bus route.
- The worksheet uses a transfer percentage of 51%, which was derived from the mode of access estimate in the previous URS ridership report.<sup>45</sup> However, the current CSI report cites a mode of access percentage of 59%. Using the higher CSI figure would result in lower fare revenue. Even this figure does not fully account for the impact of revenue-sharing for transfer trips, since some passengers will make two transfers to complete a trip, e.g. bus-to-monorail-to-light rail; the fare revenue for those trips would be split three ways.

If corrections are made for these points regarding average transfer fares, then the average fare revenue per boarding used in the Cash Flow Forecast would be lower than stated.

**Ride Free Area** – The ridership model assumes the current Metro fare structure, including the downtown Ride Free Area. However, SMP's fare revenue calculation includes these riders. We requested, but did not receive, from SMP the ridership forecast for trips in the Free Ride Area.

#### **4.2.2 Feeder Bus Service Assumptions**

SMP and CSI have assumed that 30,000 service hours, which would be saved by truncating some KCM bus routes at monorail stations, would be redeployed into more frequent feeder service. There are several issues regarding this assumption.

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<sup>44</sup> Jonathan Buchter, Director of Finance and Administration, Seattle Monorail Project, Memorandum to File, "Seattle Monorail Project Cash Flow Forecast – Fare Revenue", June 20, 2005.

<sup>45</sup> URS Corporation forecasted previous ridership estimates for the Green Line. See URS Corporation, *Seattle Popular Transit Plan Ridership Forecast Documentation to the Seattle Monorail Project*, July 2002.



- CSI assumed that several additional bus routes in the Delridge area would be truncated that were not truncated in KCM's own proposal for Green Line integration.<sup>46</sup> This suggests that these truncations may not have clear benefits to riders, and therefore may be controversial. Depending on public reaction, KCM may not agree to truncate these routes. If this occurs, projected Green Line ridership would decrease.
- Given the relatively small projected increases in future systemwide bus hours, and the competing demands from other portions of Metro's service area, it is unlikely that Metro would redeploy all 30,000 saved hours into the same area. In fact, the Seattle City Council recently approved a plan to shift 9,300 of the bus-hours to be saved due to light rail and monorail construction into funding for the South Lake Union streetcar line. In addition, Metro's ability to redeploy all of these hours, as opposed to simply reducing service-hours, may be impaired by the fact that Metro will lose fare revenue due to some current passengers shifting to the monorail, as well as having to share revenues for transferring passengers. If feeder service has less frequent service than assumed, then monorail ridership and fare revenues will be lower.

Further analysis would be required to accurately estimate the financial impact of feeder bus service assumptions on the monorail and Metro.

#### **4.2.3 Timed Transfer Assumptions**

The ridership model includes an assumption to have timed transfers between buses and monorail service at all monorail stations. Where timed transfers are assumed, the model uses a wait time of only one-tenth of the route headway, instead of the typical one-half of the headway for untimed transfers. This assumption is questionable for several reasons:

- It will be difficult to synchronize transfers at all stations. The use of single-track segments on the Green Line will result in specific time sequences for the trains operating in opposite directions at each station. Therefore timed transfers with buses may be possible for one direction of train travel, but may not work for the other direction, which could be four minutes later.
- The proposed 8-minute Green Line peak headway would not synchronize with most of Metro's bus schedules, many of which use even-clock headways such as 15 and 30 minutes.
- Metro currently uses timed transfers at only a few locations, where an off-street transit center has adequate layover space for several buses simultaneously. At many monorail stations there may not be sufficient space to allow buses to lay over long enough for timed transfers. This is especially true at downtown stations. Also, some of the feeder routes are through routes, where it would be difficult and potentially costly to add layover times at Green Line stations.

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<sup>46</sup> Cambridge Systematics with Parametrics, *Seattle Monorail Project 2<sup>nd</sup> Phase Planning Ridership Forecasting Study Final Report*, page 4-4, May 2005.

Further analysis would be required to accurately estimate the financial impact of timed transfer assumptions on the monorail and Metro.

#### **4.2.4 Major Event Ridership**

Major event ridership was not estimated using the CSI model. Major event ridership was calculated “off model”, as is standard in the transit industry as most regional travel demand model cannot pick-up the special scheduling and nuances of major events. Major events include on-going sports events such as Mariners baseball, Sonics basketball, and Seahawks football as well as more intensive activities such as the Seafair Torchlight parade.

Major event ridership was estimated by The Transpo Group, Inc.<sup>47</sup> Annual major event ridership in 2020 was assumed to range from 925,750 to 2,159,700. Fare revenue from major events was not calculated as part of the major event ridership report, but it appears that major event ridership was estimated assuming that passengers would pay the standard Green Line average fare (i.e. no premium fare would be charged). Major event ridership is estimated to be 8.4% of monorail ridership in 2011, but will make-up 16% of SMP’s fare revenue according to the Cash Flow Forecast. From 2011 through 2050, major event ridership will be 7.1% of total monorail ridership, and 12% of SMP’s fare revenue.

We reviewed the major event ridership estimates made for the Green Line and compare assumptions and results with KCM data, and data from other transit agencies that provide special event rail service.

There are several concerns with the projection of ridership and fare revenue for major events:

- CSI uses an annualization factor<sup>48</sup> of 300 to convert the ridership model estimate of weekday resident trips to an annual figure. This is based on the experience of Metro and other major transit systems. SMP then adds a separate estimate of annual major event ridership, based on the 2002 major event ridership report, to its fare revenue estimates. This may result in double-counting of some event riders. Metro’s annualization factor of 298, from which ridership model’s is based, already includes special event riders; the major event ridership report documents some of Metro’s current event ridership. While the Green Line will likely increase transit usage among attendees of special events compared to today, it is not appropriate to add all special event riders on top of an annual figure that already includes some special event riders.

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<sup>47</sup> *Seattle Monorail Project: Qualitative Estimate of Ridership for Major Events*, The Transpo Group, Inc., March 2002.

<sup>48</sup> Travel demand models estimate daily ridership. Daily ridership is converted to annual ridership using an annualization factor. Annualization factors are determined based on the amount of service (e.g. weekday and weekend hours of service) that transit agencies operate.

- SMP used the mid-range of the annual major event ridership forecast (approximately 1.5 million) to estimate fare revenue. In its Cash Flow Forecast, SMP has assumed that 66% of the major event riders (1 million) would pay a \$3.00 premium fare – which is more than the low-end of the annual major event ridership range. While SMP has chosen to use the mid-range of the annual major event ridership forecast in its estimate, the major event ridership estimate assumed that no premium fare would be charged. If SMP is to assume the \$3.00 premium fare for most major event riders, then a conservative assumption would be to use the low-end of the annual major event ridership range (925,750). A one-way fare of \$3.00 would discourage many persons, especially families, from using the monorail (\$24 roundtrip for a family of four).
- It is not clear how SMP will charge a special fare of \$3.00 for most riders to and from major events. This may be possible at venues after an event, and it could be done with difficulty prior to an event. At other locations, where there would be a mixture of event attendees and regular patrons, it is not clear how the higher fare could be charged separately to event riders. Even if riders could be differentiated, charging the special fare would likely require additional manpower and/or equipment to handle the surges of patrons.
- The 2002 major event ridership report assesses the capacity of the Green Line to handle peak event loads. The analysis was based on headways of 2 and 4 minutes. Since the Initial Operating System will operate at 8-minute headways, this analysis needs to be updated. SMP has indicated that the major event ridership forecast is currently being updated.<sup>49</sup>
- The upper-range market capture rates in the major event ridership report appear to be too high. The comparisons with other cities may be misleading. In Atlanta, for example, the MARTA rail system serves all quadrants of the metropolitan area, and has over 20,000 parking spaces at its stations. Similarly, BART has 104 route miles, 43 stations, and 46,000 parking spaces and serves both San Francisco and Oakland. The Green Line will serve a relatively small portion of the Seattle metropolitan area, and will have no parking at stations. In addition, none of the comparison cities charge higher fares for events.

#### **4.2.5 Summary of Findings for Fare Revenue and Ridership Estimates**

Our analysis of fare revenue and ridership estimates was presented above. Overall, we found some inconsistencies among the assumptions in the travel demand model, SMP cash flow forecast, and recent King County Metro data. Some of the inconsistencies can be attributed to timing, as documents and forecasts were prepared while the monorail assumptions were still being discussed. Other findings can be attributed to the use of outdated information or an apparent misapplication of the assumptions.

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<sup>49</sup> Memorandum to File, “Seattle Monorail Project Cash Flow Forecast – Fare Revenue”, Jonathan Buchter, Director of Finance and Administration, June 20, 2005.

For each of our findings we attempted to assess the potential financial impact on the monorail using data from SMP's Cash Flow Forecast model. SMP's Cash Flow Forecast was only used in an attempt to provide an order-of-magnitude assessment of the impacts. Since a monorail financial plan has not been approved, and since SMP is currently evaluating alternate monorail plans, our analysis only provides an example of how changes to major assumptions could have financial implications on the monorail.

Our findings are summarized in table 4.2, and presented in further detail below.

<b>Table 4.2 Potential Impacts of Changes to Fare Revenue and Ridership Assumptions 2011 - 2050</b>		
<b>Adjustment</b>	<b>Estimated Average Fare per Boarding</b>	<b>Cumulative % Change from SMP Average Fare per Boarding</b>
SMP Cash Flow Forecast	\$1.12	
Modify Fare Distribution Among Fare Categories	\$1.09	-2.3%
Adjust Transfer Rate	\$1.06	-4.7%
Follow Regional Transfer Policy	\$0.89	-20.3%
Reflect Potential KCM Fare Increase	\$0.79	-30.3%
Reflect Current KCM Fare Structure	\$0.64	-42.7%

The table reflects the resulting average fare per boarding if our findings were applied to SMP's fare revenue worksheet from the Cash Flow Forecast. This table includes two future fare increases assumed by SMP. Without these two future fare increases, the average fare would be further reduced. SMP estimated that the average fare per boarding would be \$1.12. An average fare per boarding of \$0.64, as we have estimated, would result in approximately 31% less fare revenue (in year-of-expenditure (YOE) dollars) from weekday resident riders than estimated in the SMP Cash Flow Forecast for 2011 through 2050. While SMP may eventually present alternative financial plans for the monorail, the table shows the sensitivity on fare revenue from changes to basic assumptions.

**Fare Revenue Distribution Among Fare Categories** – For calculating fare revenue, SMP assumed the proportion of peak riders is 76.7%. However, the CSI ridership forecast projects that 61% of Green Line riders would be peak riders.

- If SMP's Cash Flow Forecast fare distribution is modified to reflect the more recent Metro/CSI data, then SMP fare revenues would be lower than currently projected. Following CSI's fare distribution, the resulting average fare per boarding would be approximately \$1.09, a decrease of 2.3% compared to the \$1.12 that SMP assumed in its June 20, 2005 financial plan.

**Transfer Policy Assumptions** – SMP states that for passengers transferring from another mode to the Green Line, SMP would receive half of the fare revenue as is consistent with the current inter-agency agreement among the transit agencies in the region. However, in the fare revenue worksheet, it appears that SMP made errors in the application of this assumption..

- If the transfer rate is increased from 51% to 59% (which was used for the ridership estimates), the resulting average fare per boarding would be approximately \$1.06, a decrease of 4.7% compared to the \$1.12 that SMP assumed in its June 20, 2005 financial plan.
- Assuming that the transfer rate is adjusted as suggested above, then if the regional transfer policy is followed and SMP receives 50% of the transfer fare, the resulting average fare per boarding would be approximately \$0.89, a decrease of 20.3% compared to the \$1.12 that is assumed in the Cash Flow Forecast.

Both of the above estimates assume that the fare distribution is modified to reflect the more recent Metro/CSI data as suggested earlier.

**Fare and Fare Policy Assumptions** – In most instances, fare and fare policy assumptions should be consistent among King County Metro, the CSI ridership model, and the SMP Cash Flow Forecast. The initial fare assumptions in SMP's Cash Flow Forecast are not consistent with what Metro is likely to propose as part of a future fare increase.

- If Metro increases the peak fare to \$1.75, with reasonable increases in other fare categories, and SMP follows Metro's proposed fare structure, then SMP fare revenues would be lower than currently projected. This would lower SMP's assumed average fare per boarding from \$1.12 to \$0.78, a decrease of 30.3%. This assumes that SMP also modifies its fare distribution percentages and adjusts transfer fares and assumptions as suggested earlier.
- If SMP follows Metro's current fare structure, then SMP fare revenues would be lower than currently projected. With this change, and all of the suggested adjustments to fare distribution and transfers, SMP's assumed average fare per boarding go from \$1.12 to \$0.64, a decrease of 42.7%. An average fare of \$0.64 without the two future fare increases assumed by SMP would result in 49% less fare revenue (in year-of-expenditure (YOE) dollars) than estimated in SMP Cash Flow Forecast for 2011 through 2050.

In the Cash Flow Forecast, two real increases of \$0.25 in the average fare in 2015 and 2020 are assumed that are not included in the ridership model.

- If SMP's two proposed fare increases are assumed, and assuming a fare elasticity of 0.15,<sup>50</sup> then the ridership could decrease by about 8% to 18%, depending on which full

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<sup>50</sup> Fare elasticity is used to estimate the impact of fare changes on transit ridership and fare revenue. A fare elasticity of .15 means that every 10% increase in fare would result in a 1.5% decrease in ridership. A 1991 report by the American Public Transit Association (APTA) estimated fare elasticity for Seattle to be .26 for bus. Rail fare elasticity tends to be lower than for bus, and peak elasticity tends to be lower than off-peak. For this illustration, a fare elasticity of .15 was used, although the average U.S. urban rail elasticity is about .20.

peak fare is assumed. Fare revenue would decrease by 11% to 13% assuming no other changes to fare revenue assumptions.

**Ride Free Area** – The ridership model forecasts are based on assumptions that include the downtown Ride Free Area. However, SMP's fare revenue calculation includes these passengers.

- If SMP intends to honor the Ride Free Area, then the fare revenue estimate needs to be revised downward, to reflect no revenue for several thousand daily trips. On the other hand, if SMP does charge a fare for downtown trips, then the ridership forecast for these trips is over-estimated; few passengers will pay a \$1.75 fare to ride a short distance on the monorail when they can make a similar trip for free by bus or light rail. In addition, bus frequency would be higher than monorail frequency on many downtown streets, and bus downtown stops at street level provide more convenient access for short trips than elevate monorail stations. We requested, but did not receive, from SMP the ridership forecast for trips in the Ride Free Area. Therefore, we cannot assess the impact of assumptions regarding the Ride Free Area.

**Feeder Bus Service** – In the ridership model, it was assumed that several additional bus routes in the Delridge area would be truncated that were not truncated in KCM's own proposal for Green Line integration. Metro has estimated that truncated lines to provide monorail feeder bus service would save approximately 30,000 service hours. Given the relatively small projected increases in future systemwide bus hours, and the competing demands from other portions of Metro's service area, it is unlikely that Metro would redeploy all 30,000 saved hours into the same area.

- Further analysis would be required to accurately estimate the financial impact of feeder bus service assumptions on the monorail and Metro.

**Timed Transfers** – The ridership model includes an assumption to have timed transfers between buses and monorail service at all monorail stations. This would likely not be possible, as only a few lines could be synchronized.

- Further analysis would be required to accurately estimate the financial impact of time transfer assumptions on the monorail and Metro.

**Major Event Ridership** – SMP adds the estimate of annual major event ridership to annual resident ridership to estimate fare revenue. However, the ridership model's annualization factor inherently includes some major event riders because the transit systems, including Metro, from which it is based, include some special event riders in their annual estimates.

- SMP method for annualizing major event ridership may result in double-counting of some event riders because all special event riders are added to an annual weekday resident figure that has been annualized using a factor that inherently includes some special event riders.

SMP has assumed that 66% of the annual major event riders (1 million) would pay a \$3.00 premium fare, but the major event ridership estimate assumed that no premium fare would be charged.

- If SMP charges a premium fare, then major event ridership would likely be lower than the estimate. Furthermore, at locations where there would be a mixture of event attendees and regular patrons, it is not clear how the higher fare could be charged separately to event riders.

The major event ridership estimate was based on headways of 2 and 4 minutes, but the Initial Operating System will operate at 8-minute headways.

- Since the major event ridership was estimated assuming more frequent headways than are actually going to be operated when the monorail begins service, major event ridership is probably overstated.

The comparison with other cities of potential passengers that may ride the monorail for major events may be misleading. Unlike many of the comparison cities, the Green Line will serve a relatively small portion of the Seattle metropolitan area, and will have no parking at stations. In addition, none of the comparison cities charge higher fares for events.

- The upper-range market capture rates in the major event ridership report appear to be too high.

#### **4.3 NON-FAREBOX OPERATING AND OTHER REVENUE**

Non-farebox operating revenue includes miscellaneous items that may generate revenue from operations, but not including fare revenue. For this review, we focused on SMP's proposed tourist products because they are estimated to contribute a relatively high amount of revenue for SMP.

SMP's main tourist product is the Explorer Pass. As described by SMP, "The Explorer Pass is a one-day or three-day pass to ride the Monorail packaged in a pocket-sized, guide book format with insider information about the neighborhoods of Seattle served by the Green Line.

SMP's reliance on Explorer Pass revenues to fund operations presents significant risk to the financial viability of the monorail operations for several reasons:

- The Explorer Pass pricing may be too high to attract high sales volumes or to generate the assumed net revenues for SMP.
- The share of the operating budget funded by net Explorer Pass revenue may be too high.
- SMP may have less certainty with sales to the tourist market than other market segments.

### 4.3.1 Explorer Pass

The SMP Financial Forecasting model includes revenues from the sales of the Explorer Pass to offset operating costs. In addition to the monorail pass, the Seattle Explorer Pass would also include discounted entry to many of the area's most popular attractions served by the Green Line and perhaps some discounts at businesses along the Green Line. The SMP Cash Flow Forecast assumes that the one-day pass would cost \$19 for adults and \$12 for youth. The three-day pass would cost \$29 for adults and \$19 for youth.

SMP would receive 65 percent of the sales revenue less marketing costs of \$300,000 per year. The SMP Cash Flow Forecast assumes that channel sales costs would be 35 percent of the gross Explorer Pass sales.<sup>51</sup> As described by SMP, "The Seattle Explorer Pass will be sold through the existing channels that best reach overnight and day-trip visitors to Seattle. ... Seattle Explorer Passes will be sold through hotels, cruise ship tour directors, visitor centers, other tourist attractions, travel agents, travel websites and, potentially, directly through vending machines in Monorail stations. Channels will receive up to 35% of the retail price."<sup>52</sup> From the materials provided by SMP for this analysis, it appears that SMP would not directly compensate attractions and vendors offering discount coupons for the Explorer Pass.

SMP conducted a market analysis for the Explorer Pass based on the total number of annual visitors to Seattle and the market penetration for various Seattle tours. Based on this information, SMP projected conservative market penetration. As stated in the financial plan documents, "The selected aggregate penetrations for the Seattle Explorer Pass (one and three day versions) are, in all cases, lower than the average Seattle tour's market penetration."<sup>53</sup>

**Explorer Pass Price May Be Too High to Attract Sales Volumes or Generate Assumed Net Revenues** – Documents provided by SMP for this analysis do not address the Explorer Pass pricing.<sup>54</sup> To determine the reasonableness of the Explorer Pass pricing, comparisons were made with other tourist products in Seattle and current transit pricing in Seattle (including the existing monorail) and in other US cities. In addition, assumptions about the perceived value of the coupons to tourists were developed. Based on this analysis, the Explorer Pass prices used by SMP in the Cash Flow Forecast may be too high. Further information about the Explorer Pass pricing and value of coupons may result in adjustments to this conclusion.

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<sup>51</sup> Buchter, Jonathan, Director of Finance and Administration and Stephen Brown, Lead Entrepreneur, Seattle Monorail Project, "Memorandum to the File, Seattle Monorail Project Cash Flow Forecast – Tourist Products," June 20, 2005, p. 5.

<sup>52</sup> Ibid., p. 3.

<sup>53</sup> Ibid., p. 4.

<sup>54</sup> The financial analysis consultant team has requested documentation about the pricing of the Explorer Pass from SMP. As of this report's publication date, this information has not been received.



The following table summarizes the comparison of the proposed Explorer Pass and the Seattle CityPass.<sup>55</sup> The Explorer Pass and the City Pass are distinct products, but could compete for the same tourist market in Seattle. For \$42, adults can purchase the City Pass and gain free entry to six Seattle attractions. The City Pass does not include transportation (other than a boat tour of Seattle's waterfront), map, or guidebook. In comparison, the Explorer Pass would include free entry to the monorail, with a map, guidebook, and as yet undetermined coupons and/or free or discounted admissions to local attractions. The actual venues to offer discounts and their value have yet to be determined.

<b>SMP Explorer Pass</b>		<b>Seattle City Pass</b>	
<b>Price (Adult)</b>		<b>Price (Adult)</b>	
\$29		\$42	
<b>Duration</b>		<b>Duration</b>	
3 Days		9 Days	
<b>Free/Discount Admissions</b>	<b>Value</b>	<b>Free Admissions (One Each)</b>	<b>Value</b>
Unlimited Monorail Trips	\$1.50 each	Woodland Park Zoo	\$10
Space Needle ?	Discount Uncertain	Space Needle	\$13
Pacific Science Center ?	Discount Uncertain	Pacific Science Center	\$15
EMP/Sci-Fi Museum ?	Discount Uncertain	Seattle Aquarium	\$12
Other?		Argosy Cruises - Seattle Harbor Tour	\$18.75
		The Museum of Flight	\$14
<b>Map and Guide</b>		<b>Map and Guide</b>	
Included		Not Included	
<b>Coupons</b>		<b>Coupons</b>	
Included, Discount Uncertain		Not Included	

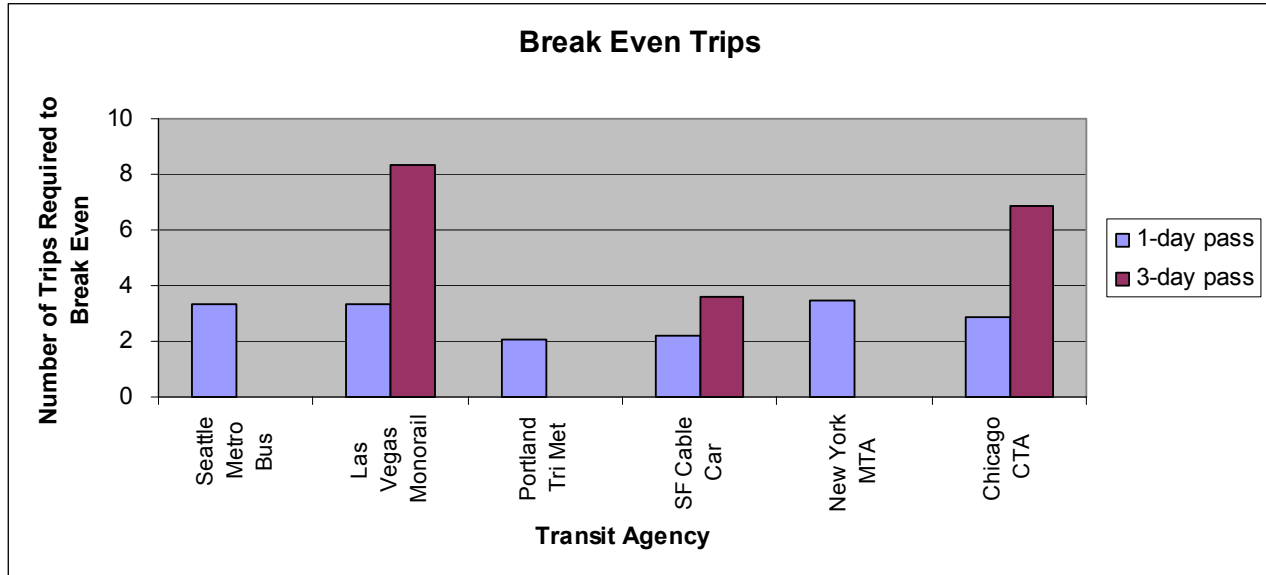
In most cases, visitors will compare the price of a pass with the total price of the venues they plan to visit. If the pass price is lower, a visitor is more likely to purchase the pass. Because the list of attractions tourists want to see varies from person to person, each will have a different "perceived value" for a given pass program.

In the case of the Explorer Pass, the perceived value is currently unknown, as the venues and value of the coupons have not been determined, and the map and neighborhood guide have not be fully designed. However, the monorail access component of the Explorer Pass can be assigned an approximate value through a comparison with other transit agencies' one- and three-day passes.

The following chart shows the number of full cash fare trips that a passenger would have to make in order to break even with the one- and three-day passes offered by various transit operators. As shown in this table, the break-even points for one-day passes for other transit

<sup>55</sup> <http://citypass.com/city/seattle.html>, accessed June 23, 2005.

agencies range from 2.1 to 3.5 trips, with an average of 2.9 trips. For three-day passes, the break-even point ranges from 3.6 to 8.3 trips, with an average of 6.3 trips.



Note: The fares for other transit agencies are based on their published fares as of September 21, 2005.

Assuming an adult cash fare of \$1.50 for the Seattle Monorail and a break-even point of three trips (rounding up from 2.9), the break-even transit value of the one-day Explorer Pass would be \$4.50. Following the same logic, the transit value of the three-day pass would be approximately \$10.50. If a tourist plans to take more trips on the monorail, the transit value of the pass would be higher.

If the transit value is subtracted from the retail price of the Explorer Pass, the remainder would be the approximate perceived value necessary for a tourist to consider purchasing the Explorer Pass. In other words, if a typical tourist assumes she will take three trips on the monorail in one day, she would need to perceive \$14.50 in other value from discounts provided in the one-day Explorer Pass to determine that the Explorer Pass would be a good value to her. For the three-day pass, the perceived non-transit value would have to be \$18.50 for the Explorer Pass to be perceived as a good value.

To reach the perceived value points, the coupons, map and guide components of the Explorer Pass would have to be significant. If the value of each coupon is not high, the retail price of the Explorer Pass may be too high to attract significant sales. As a result, the tourist revenues included in SMP's Cash Flow Forecast may be overstated.

On the other hand, if the value of the coupons provided substantial discounts to the venues, it is likely that SMP would have to compensate the venues for the use of the coupons. Other pass programs such as City Pass operate in this manner. Compensation to other venues, in turn, would reduce the net revenue from the Explorer Pass sales available to SMP.

**Percentage of Fare Income Explorer Pass Generates** – The reasonableness of the market penetration and value of the Explorer Pass becomes an important issue when viewed in terms of the SMP’s reliance on tourist product revenue to reach operational self-sufficiency in 2020.

SMP’s Cash Flow Forecast includes \$4,480,285 in net Explorer Pass revenue in 2011, its first year of operations.<sup>56</sup> This is 14 percent of total passenger revenues, and 9 percent of the total direct operating cost in 2011.<sup>57</sup>

These percentages have been compared with financial information from San Francisco Municipal Railway (SF Muni), the operator of light rail, bus, and cable car operations in San Francisco. Like the Seattle monorail, cable cars are a strong tourist attraction in San Francisco. SF Muni’s Fiscal Year 2004 Actuals include \$15,446,312 in cable car revenues, which includes cash fares, one- and three-day pass sales, and Cable Car souvenir tickets.<sup>58</sup> This is 14 percent of systemwide total passenger revenues, and 3 percent of the total systemwide operating cost. SMP’s Cash Flow Forecast contains a similar percentage of fare revenues from tourists as San Francisco’s cable cars. However, SMP has a greater dependence on tourist revenues to fund the system’s total operations.

**Less Certainty in Tourist Markets than Other Market Segments** – SMP’s Cash Flow Forecast includes a significant reliance on net tourist product sales. Tourist ridership is subject to market forces beyond the control of SMP, such as domestic and international economic factors, international monetary factors, transportation prices, and competition from other tourist attractions.<sup>59</sup> Further, the SMP business plan for the Explorer Pass assumes that third parties market and sell the SMP product. Thus, to reach operational self-sufficiency, the SMP Cash Flow Forecast places significant reliance on a relatively changeable market over which SMP has little influence.

If actual tourist revenues fall short of the estimates included in the Cash Flow Forecast, SMP will face an additional challenge in reaching operational self-sufficiency by 2020.

#### **4.3.2 Summary of Findings for Non-Farebox Operating and Other Revenue**

For this review, we focused on SMP’s proposed tourist products because they are estimated to contribute a relatively high amount of revenue for SMP. SMP’s main tourist product is the Explorer Pass.

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<sup>56</sup> Jonathan Buchter, Director of Finance and Administration and Stephen Brown, Lead Entrepreneur, Seattle Monorail Project, “Memorandum to the File, Seattle Monorail Project Cash Flow Forecast – Tourist Products,” June 20, 2005, Tourist Products, Explorer Pass Revenue Projections, p.1.

<sup>57</sup> Seattle Monorail Project Cash Flow Forecast, Sources of Funds and Uses of Funds for 2011, June 20, 2005, p. 1.

<sup>58</sup> Fare Revenue, San Francisco Municipal Transportation Agency, San Francisco Municipal Railway, FY2006 Projected Revenue, FY 2004 Actual.

<sup>59</sup> CIC Research, Inc., *2004 Market Profile and Economic Impact of Seattle-King County Visitors*, prepared for Seattle’s Convention and Visitors Bureau, June 24, 2005.

SMP's relatively high level of reliance on revenue from a tourist product, such as Explorer Pass, to fund operations presents significant risks to the ability for monorail operations to become self-sufficient by 2020. If not for this requirement, the risks would not be as great. The fact that the components of the Explorer Pass have not been finalized presents added risk in itself.

- Information about how price of the Explorer Pass was determined was not available.
- Comparisons with other tourist products in Seattle and transit pricing in Seattle and other U.S. cities indicate that the pass price may be too high to attract sales volumes or generate assumed net revenues.
- In first year of operations, 14% of fare revenue is from Explorer Pass and 9% of direct operating cost. Comparison to SF cable cars indicates that the fare income expected from Explorer Pass may be too high.
- Placing a relatively high reliance on tourist revenue presents financial risk. There is less certainty in tourist markets than other market segments that would drive monorail ridership, and SMP has little influence with the overall tourist market.

## **5.0 COST ASSESSMENT**

The purpose of the cost assessment is to review the capital and operating and maintenance (O&M) cost estimates and assumptions made by SMP and Cascadia. The capital and operating costs of the proposed Green Line determine the funding requirements to build the Green Line as well as the ongoing funding requirements to operate and maintain the monorail after revenue service begins.

### **5.1 CAPITAL COSTS AND OPERATING COSTS**

The purpose of this task is to determine if SMP's capital cost assumptions and operating plans are reasonable, if there is enough capacity to operate the system given ridership demand and operating plans, and whether the capital and O&M costs in the Cash Flow Forecast model are consistent with Design-Build-Equip Contract (DBEC), Operate and Maintain Contract (OMC), and operating plans. We also determined if the service levels that drive O&M costs are consistent with the service levels used in the ridership model.

We did not conduct an extensive review of capital unit costs because there is a fixed construction fee as part of the DBEC. We focused our capital cost assessment on whether all expected costs were included in the cost estimate, and which costs were the responsibility of SMP, which would fall outside of the fixed-price contract, rather than Cascadia.

We reviewed the Design-Build-Equip Contract (DBEC) to ensure that all costs associated with the Green Line have been identified, and to determine the financial responsibility of each party. Our findings were presented in Section 1.1.

We also reviewed the (OMC) to ensure that all costs associated with the Green Line have been identified, and to determine the financial responsibility of each party. Our findings were presented in Section 1.2.

The legislation that created the SMP specifies that, starting in 2020, MVET revenues cannot be used to subsidize operations. Fares and other operating revenues were discussed in Section 2.0. This section presents our analysis of operations and operating and maintenance (O&M) costs.

#### **5.1.1 Consistency of Assumptions of System Characteristics**

The travel demand model, contracts, and Cash Flow Forecast should work from consistent assumptions to ensure that costs are correctly matched against service levels. Assumptions with regard to system characteristics, such as service frequency and the number of stations, among other items, are used by the travel demand model to determine ridership. Ridership levels determine the number of vehicles required. Service frequency is a major component for

determining operating and maintenance costs. Vehicles and stations are a major part of capital costs (and maintenance of these assets also drives operating costs).

There are inconsistencies among assumptions with regard to system characteristics used in the travel demand model, DBEC/OMC, and Cash Flow Forecast. Table 5.1 shows the operating plan assumptions for the travel demand model, contracts, and Cash Flow Forecast.

<b>Table 5.1</b>			
<b>Basic Assumptions of System Characteristics</b>			
<b>System Characteristic</b>	<b>CSI Ridership Model</b>	<b>SMP Cash Flow</b>	<b>OMC/DBEC</b>
<b>2011</b>			
Peak Frequency	8 min. North & South 4 min. Downtown	8 minutes	8 minutes
Stations	16	16	16
Vehicles	N/A	13	13
<b>2030</b>			
Peak Frequency	6 min. North & South 3 min. Downtown	8 minutes	6 min. North & South 3 min. Downtown
Stations	19	16	19
Vehicles	N/A	13	13

NOTES:

N/A – Not Applicable.

\* The initial term of the Operate and Maintain Contract is five years. Although the final operating plan (referred to as 2030 in this table) is mentioned in the OMC, costs are only stated for the initial operating plan.

**2011 Service** – The O&M costs estimated by the Cash Flow Forecast and the OMC are based on an assumed service frequency of 8-minute headways for 16 stations. Capital costs in the DBEC are also based on this operating plan. The ridership forecast for 2011 is based on assumptions including 16 stations and 8-minute peak headways for the north and south regions, and 4-minute headways for the downtown region.

The extra service assumed in the travel demand model would require additional vehicles. The capital vehicle costs and associated O&M costs for this difference are not included in the DBEC, OMC, or in SMP's Cash Flow Forecast. This discrepancy has one of two possible implications:

- If the 4-minute downtown service is not operated, then the ridership forecast is too high, as is the resulting fare revenue estimate.
- If the 4-minute downtown service is actually operated, then the operating cost estimates are too low, and the estimates of vehicle requirements and resulting capital costs are too low.

**2030 Service** – The 2030 ridership forecast is based on a final system with 19 stations and 6-minute and 3-minute headways. The difference in the ridership forecast implies that the improvements (3 new stations and more frequent service) are implemented in relatively even phases over the 20-year period. However, the cash-flow model does not indicate any capital

expenditures or additional O&M costs for these improvements (since the initial term of the OMC is 5 years, this finding is not directly applicable to that contract).

In the cash flow forecast the system operating cost is projected to increase only based on inflation assumptions from 2011 to 2030. The operating cost for 2030 and some preceding years should include additional operating and maintenance expenses for the expanded system. The more frequent service would result in an increase in train-miles and hours of about 40-50%, resulting in higher costs for traction power and vehicle maintenance. Station-related expenses would increase by about 15-20%. Fare media expenses would increase in proportion to ridership, or about 25%.

It does not appear that the capital costs of these improvements (stations, rail cars, fare gates) were programmed by SMP. SMP staff has stated that the capital reserve fund could be used for this purpose, but no expenditures are shown. These improvements could use most, if not all, of that fund, leaving little for other ongoing capital expenses.

### **5.1.2 System Capacity**

Projected ridership levels appear to exceed the defined system capacity. The CSI ridership report cites a peak hour maximum directional load of 2,425 passengers in 2030, occurring in the AM peak hour from Yesler Station to Madison Station. If the initial operating plan is still in effect in 2030 (as implied by the operating costs in the Cash Flow Forecast), then the line load greatly exceeds the capacity of 1,545.

An even more critical loading condition would occur in the 2011 to 2018 time period when the system is expected to carry additional riders due to the removal of the Alaskan Way Viaduct. For example, in 2015 the projected maximum line load, based on interpolation of the ridership model estimates for 2011 and 2030, would be about 2,050. This figure alone exceeds the projected initial line capacity of 1,545 passengers. However, this figure does not reflect the additional riders expected as a result of the Alaskan Way construction. This project is forecast to result in an additional 8,300 daily monorail trips between West Seattle and downtown. This would mean about 1,250 additional peak hour trips, of which approximately 1,000 would be aboard at the maximum load point. This means the total peak hour line load would be about 3,050, nearly double the defined line capacity of 1,545.

### **5.1.3 Future System Expansion**

SMP has stated that system capacity can be increased in the future by running trains more frequently (as assumed in the 2030 ridership forecast), and by increasing the train length to more than two cars. This would be done without extending the platforms at stations, on the assumption that passengers could walk from the lead and rear cars of the train to the center cars for alighting.

While this is physically possible, it is a highly unusual assumption for an urban transit system with relatively short trip lengths (this is more common in commuter rail system where stations are spaced further apart and there are fewer standees). Many passengers who can't find seats in the center cars are likely to stand in those cars, rather than go to the trouble of walking to reach an end car, and then walking back to the center cars before they reach their destination. The effect would be uneven loading of the train, with much higher numbers of passengers in the center cars than in the end cars. Under peak conditions, this will lead to congestion around the doors and in the aisles of the center cars, which will result in longer dwell times. This could lead to longer cycle times and potential delays, especially at single-track segments where train schedules will be closely synchronized.

Under the multi-car concept, station platform size may also become an issue. National fire codes drive platform sizes and the number and size of station egress routes. The platform must be large enough and the emergency stairwells and other routes must be wide enough to handle an emergency situation. While the fire codes require further investigation, the basic concept is that the platforms and egress routes must be adequate to handle the sum of about three times the capacity of a train (two times for passengers waiting for a train assuming a missed headway plus one time for passengers existing the train). If multi-car concept is operated, the stations must be designed to accommodate double the passengers under the standard concept. It is unclear whether SMP has planned stations around the multi-car concept. Further analysis of national fire codes would be required.

#### **5.1.4 Vehicle Capacity**

The Initial Operating System calls for two-car trains on 8-minute headways, or an average of 7.5 trains per hour. Each monorail two-car train will have 70 seats and capacity for 136 standees for a total of 206 passengers. This vehicle configuration results in an hourly seated capacity of 525 seats per hour per direction. SMP has defined the initial line capacity to be 1,545 passengers per hour per direction, including standees. This is equivalent to a load factor (the ratio of passengers to seats) of 2.94. While it is routine for urban rail systems to carry standees at peak locations and times, operating with such a high load factor is generally not desirable for everyday operations. On cars crowded with standees, it becomes difficult for passengers to make their way to and from the doors at their station. This can result in extended dwell times, or in the case of an automated system, doors closing before all passengers have entered or exited. By way of comparison, Sound Transit has used a maximum load factor of 2.0 in planning the light rail system.

Although the monorail cars appear to be designed to handle significant standing loads and larger-than-average load factors, the 2.94 load factor would still result in a very crowded car. One method of assessing passenger comfort is measuring passengers per unit train length. The monorail cars would have 6.3 passengers per linear meter (32.6 meters/206 passengers),



surpassed only by New York City and Toronto heavy rail systems in North America.<sup>60</sup> By comparison, SkyTrain in Vancouver carries 5.9 passengers per linear meter.

Another measure passenger comfort is gross vehicle floor area per passenger.<sup>61</sup> The proposed monorail car would provide 3.3 square feet per passenger. Studies performed for vehicle capacity standards indicate that a measure of 5.4 square feet per passenger is “Adequate”, while 3.8 square feet per passenger would be “Tolerable with difficulty” and is considered the lower limit in North America. An occupancy resulting in 2.2 square feet per passenger is considered “Totally intolerable” and is the least amount of space that is occasionally accepted. The proposed monorail would fall between “Tolerable with difficulty” and “Totally intolerable” if these standards are used.

It is difficult to gauge what the public’s perception will be regarding vehicle capacity on the monorail. The choice of comfort is very subjective. The point of this comparison is to show that passengers will not tolerate consistently crowded monorail cars.

### **5.1.5 Capital Asset Replacement Program**

The DBEC and OMC do not contain details regarding the Capital Asset Replacement Program (CARP). The CARP would normally contain a schedule for capital asset replacement of items such as electrical systems, station roofs, vehicles, etc. The OMC indicates that SMP and Cascadia will negotiate the CARP price within 42 months after the Notice to Proceed (Article 7, Section 1.2.1). The Cash Flow Forecast contains a CARP estimate of \$1.5 million for 2013, with a 40% increase to \$2.1 million followed by a 14.3% increase to \$2.3 million for 2015. In subsequent years, the \$2.3 million grows with inflation in the financial model. In reality, the cost of the CARP would grow as the system ages, with annual fluctuations depending on the value of assets being replaced in any given year.

**Non-Vehicle Assets** – There is increased risk to SMP and the City of Seattle because the CARP does not appear to be funded through the OMC as discussed in our contract review in section 1.2.2. Furthermore, it seems that the Cash Flow Forecast understates CARP costs. We performed a simple analysis of the Green Line using standard transit industry replacement criteria for various classes of assets. The funding required for the CARP varied annually reflecting the cyclical nature of asset replacement requirements. Our analysis indicated that capital funding required for the CARP would be approximately \$10 million each year (2005 \$s), excluding vehicles.

**Vehicle Replacement and Overhaul** – As stated in our review in section 1.2, the OMC does not contain costs for replacing or overhauling vehicles. Furthermore, we could not find a clause

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<sup>60</sup> Transit Cooperative Research Program, *Transit Capacity and Quality of Service Manual-2nd Edition*, Washington D.C., 2003, Table 5.63m.

<sup>61</sup> Pushkarev, Boris S., Jeffrey M. Zupan, and Robert S. Cumella, *Urban Rail in America: An Exploration of Criteria for Fixed-Guideway Transit*, Indiana University Press, Bloomington, IN (1982).

covering fleet defects in the OMC. While the useful life of a monorail vehicle may fall outside the limits of the Cash Flow Forecast, most transit vehicles receive a major overhaul about half way through their useful lives, costing about half of what a new vehicle would cost.. This would be in about 15 years (2026) after start-up for a monorail vehicle (assuming a 30-year useful life). Overhauling all 13 monorails cars would cost about \$50 million in 2005 dollars.

### **5.1.6 Summary of Findings for Capital and Operating Costs**

Our analysis of fare revenue and ridership estimates was presented above. There are inconsistencies among the ridership model, Cash Flow Forecast, and the design-build contracts that results in either an underestimation of capital and operating costs, or an over-estimation of ridership.

- The 2011 operating plan used to estimate ridership does not match the OMC or SMP cash flow, meaning the ridership is likely overestimated.
- The 2030 service frequency and number of stations used in the ridership forecast and assumed for the OMC are greater than in the SMP Cash Flow Forecast, meaning that O&M costs associated with the increased service were not captured and the capital costs associated with the three additional stations and additional trains were also not included in the Cash Flow Forecast.
- Projected ridership levels appear to exceed the defined system capacity, especially in the 2011 to 2018 time period when the system is expected to carry additional riders due to the removal of the Alaskan Way Viaduct.
- SMP has stated that system capacity can be increased in the future by running trains more frequently (as assumed in the 2030 ridership forecast), and by increasing the train length to more than two cars. While longer trains are physically possible, this configuration could cause train delays as people must walk through the full length of a crowded car to exit the train.
- Monorail vehicles could be very crowded, as the load factor (total vehicle capacity compared to the number of seats) and other measures of comfort are not desirable compared to most U.S. transit operators.
- There appears to be inadequate funding for the Capital Asset Replacement Program, as the funds that SMP is estimating for this purpose are likely not adequate.

## **6.0 FINANCIAL CAPACITY ASSESSMENT**

The purpose of the financial capacity assessment is to determine the magnitude of SMP's ability to issue bonds based on a set of assumptions for revenue forecast and project expenses using conventional bond structures. While the SMP financial plan was not adopted by the SMP Board, this analysis takes a generic look at financial capacity as it pertains to the Green Line. The analysis provides an overview of a basic financing structure and alternative structures that may be proposed by SMP if it prepares a new financing plan. The analysis also describes the debt issuance process so that readers can understand the complexities of even a basic bond issuance.

In general, we recommend that City refer to the rules of thumb outlined below to gauge how any proposed bond structure considered by SMP would deviate from them. This will provide a gauge for investors' reception of SMP's bonds. Also, the decision makers need to remember to look at the big picture in terms of the political and financial consequences of any proposed structure. This is more than solving a financial puzzle whereby the revenue stream doesn't appear to sunset. In an environment of limited resources, SMP and the City must ultimately decide if the project is feasible and prudent from a cost-benefit perspective.

### **6.1 PLAN OF FINANCE APPROACH**

This is the initial step for developing a roadmap for debt financing. Issuers will work closely with a financial advisor and/or underwriter to determine some basic parameters which are outlined below.

#### **6.1.1 Base Case Analysis**

In general, the base case analysis with debt financing consists of a review of the mix of revenue(s) available for debt service payment and expenditures eligible for debt financing. The base case analysis with debt financing identifies the magnitude, timing and duration of any cash flow deficit. General rules of thumb for the base case analysis with debt financing are:

- Cash flow deficits lasting 2 to 7 years could be "smoothed out" using conventional 30-year debt structure assuming a steady revenue source.
- Total debt service should be approximately 2 to 3 times the amount of borrowing; amount may rise if interest is capitalized.
- The term of a financing should have a similar average life as the asset being financed.
- Variations from a conventional structure are perceived as additional risk by investors. Investors demand a higher interest rate for assuming greater risk, reducing the amount of bond proceeds given a fixed stream of revenue available for debt service payment and term. The bond issuer must weigh the benefit of accessing capital now against the risk.

**Base Case Analysis Using “Plain Vanilla” Special Revenue Bond Structure** – The municipal bond market is a very mature and efficient source for municipalities to access capital using conventional bond structures. However, anytime an issuer deviates from the conventional structures, investors will demand a risk premium in the form of higher interest rates. Given a fixed source of revenue available for debt service, this would result in a lesser amount of funds available for projects. Features of a conventional structure include:

- 1.1x debt service coverage on historical revenue levels. Most bonds are structured such that the net revenue available for debt service in the year prior to the issuance is equal to 110% (1.1x) to 120% (1.2x) of estimated annual debt service. In the case of SMP, this would represent the annual MVET revenues achieved at time of bond sale.
- Current interest bonds.
- Capitalized interest through the construction period.
- Standard debt service reserve fund at maximum annual debt service.
- 2% Costs of Issuance.
- 30-Year bonds are the standard term.
- For illustration purposes only, this structure would produce the following results assuming that annual debt capacity is \$75 million per year and an average interest rate of 6% and 5 years of capitalized interest. Additionally, results for the same structure with a 40-year term are also shown.

<b>Plain Vanilla</b>	<b>30-Year Bonds</b>	<b>40-Year Bonds</b>
Par Amount / Total Issuance	\$871,564,999	\$988,479,999
Less: Debt Service Reserve Fund	(68,181,300)	(68,181,800)
Less: Costs of Issuance	(10,458,780)	(11,861,760)
Less: Capitalized Interest	(233,338,529)	(264,639,435)
Less: Underwriter's Discount	(6,972,520)	(9,707,840)
<i>Net Available for Projects</i>	<i>\$552,613,870</i>	<i>\$635,889,164</i>
Net Interest Expense	832,924,500	1,397,799,600
Total Debt Service (Par + Net Interest)	1,704,488,499	2,387,279,599

The summary result is meant to provide a point of reference of the approximate amount of net bond proceeds that can be raised using a conventional bond structure set of assumptions. Note that the \$75 million of annual funds available for debt service is simply an assumption. The SMP Cash Flow Forecast shows only \$30.3 million available for debt service in 2011, or approximately 40.4% of the assumption used in this example. Net revenue available is projected to be \$75 million or higher in 2016 per the SMP Cash Flow Forecast.

We recommend that if SMP submits another financial plan for consideration, a baseline analysis analogous to the “plain vanilla” structure outlined above should be conducted using current market rates, updated cash flow summary, and multiple series of issuances. This baseline analysis provides the basis of evaluating the incremental cost of using a riskier debt structure.

### **6.1.2 Debt Capacity Using Alternative Financing Structure**

Alternative financing structures are often considered to: 1) generate more net funds available for a project; and/or 2) provide a better matching of sources of funds for the payment of debt service. In the case of SMP, both of these outcomes are desirable given the large construction cost requirement and the significant borrowing potential against the future growth of MVET.

**Zero Coupon Bonds** – Given the limited capacity to pay debt service in the early years, zero coupon bonds are often the financing tool used to leverage funds. Issuers avoid using zero coupon bonds, if possible, given their non-callable feature and the interest rate penalty associated with it. The interest rate penalty could range from ½ percent to 1½ percent higher than current interest bonds depending on the maturity. Additionally, the costs of issuance for zero coupon bonds are higher given that underwriters' discount is calculated as a function of the par amount (the amount being issued). Given the same amount of net funds available for projects, a zero coupon bond issue will have a much greater par amount than a current interest bond structure, meaning fewer funds would be available for projects.

**Bonding Against Future Revenue** – Another method to raise additional funds is to bond against future revenue. It appears that there is a significant potential for leveraging future MVET growth, which SMP estimates to grow annually in the 6.0% range starting in 2012. Most bond issues for public transit projects are structured using historical revenue. Transportation issues that have been structured using revenue growth projections are toll road projects, where the toll revenue serves as the primary security and another revenue source is typically pledged as secondary security. More frequently, bonding against future revenue growth is associated with land-based transactions for raw land development or redevelopment of depressed properties/areas where assessed value is expected to increase significantly as a result of the development. These are proven financing structures which are typically supported by independent appraisals, detailed market studies showing supply and demand, absorption rates and tax rate analyses. In the case of SMP, no direct correlation exists between the project and the revenue source. The credit analysis will be based on the MVET forecast which may not provide sufficient comfort to investors.

As in any market, the municipal bond market is driven by supply and demand for commodities such as conventional (i.e. "plain vanilla") bond issues. However, markets can be created for unconventional structures given the right price. The question to SMP and the City is what would be the right price, or interest rate, in order to finance the monorail project? Is the price too steep to be a market maker given the benefits that the monorail project will provide to the taxpayers and citizens of Seattle?

### **6.1.3 Debt Issuance Process: Structuring, Credit Review, Pre-marketing, Pricing**

The debt issuance process can be a long journey for first time issuers, and even more so for first time issuers utilizing innovative financing techniques. Issuers work with their working group

members including investment bankers, financial advisors, feasibility consultants, revenue forecast consultants, bond lawyers, tax lawyers and staff to review every aspect of the proposed financing to ensure that the financing would be successful when it's brought to the market place. The basic debt issuance process involves the following steps:

- Identify viable financing structures, some of which are described above.
- Legal review/due diligence:
  - Validation of revenue projections by an independent third party.
  - Ensure that all identified structures comply with local, state and federal tax codes and regulations.
  - Draft and review bond documents, the financial plan, and disclosure documents.
  - If the recommended structure includes unrated bonds, the senior underwriting firm will seek formal approval by the firm's Underwriting Committee, which includes extensive credit review and pre-marketing efforts.
- The credit review is one of the most important steps for a bond financing. This is the process of securing credit ratings and bond insurance, which serves as the basis for pre-marketing and, ultimately, the pricing of bonds. Credit analysts will typically evaluate the following factors:
  - Security: the credit strength of the proposed structure is that the revenue source is independent of the project and that the revenue source (e.g. MVET) represents a stable revenue source.
  - Voter Authorization: A relative strength if the revenue source, like the MVET, has no sunset date.
  - Revenue-raising Flexibility: A relative strength if the flexibility to raise more revenue is high. For the monorail this would be limited since service is not directly linked to the security source.
  - Service Area: A relative strength is the service area is broad. The monorail may be considered to have a limited service area for a large commitment of revenue stream.
  - Bond Structure. There more risk for bond structures that have the following characteristics:
    - Borrow against projected revenue.
    - Uncertain timing of repayment.
    - Political sensitivity to the high cost of leveraging.
    - Insurability is questionable depending on the final structure.
  - Presentation: The financial advisor and underwriting team will prepare the staff of the issuing entity for rating agency presentation (e.g. SMP staff and possibly Board members).
- Pre-Marketing & Bond Pricing
  - The underwriting team will circulate the disclosure document to all potential investors and respond to any inquiries.
  - Depending on the structure, presentations by the issuing entity (e.g. SMP) to investors may be arranged. Alternatively, private calls may be arranged between the issuing entity and certain potential investors.

- Depending on the size of the bond issues, the underwriting team may take one or more days to “pre-price” the bonds (actually getting pricing indications from interested buyers). This gives the issuing entity the opportunity to gauge the marketability of its bonds.

The process of issuing bonds requires a lot of work and attention to detail. This is particular true for a first time issuers, a new type of credit (e.g. MVET) and/or unconventional structure. Should SMP ever attempt to go to market with all these conditions, we recommend that the City conduct a thorough analysis of SMP’s credit review. Should the ultimate structure include unrated financial instruments, we recommend that the City conduct a through analysis of SMP’s Underwriting Committee’s written approval of the financing structure. If SMP eventually attempts to issue debt, it is in the City’s best interest that the bond offering is successful so that SMP can establish itself as a quality first time issuer. One concern is that an untested creative financial structure may result in a failed sale, which may then impact the cost of future financings. While SMP is a separate government entity from the City of Seattle, any negative view of SMP in the financial markets could tarnish SMP and, by inference, the City’s reputation in the municipal bond market.

#### **6.1.4 Summary of Findings for the Financial Capacity Assessment**

Our analysis takes a generic look at financial capacity as it pertains to the Green Line. In general, we recommend that City refer to the rules of thumb outlined in this section to gauge how any proposed bond structure considered by SMP would deviate from them. This will provide a gauge for investors’ reception of SMP’s bonds.

As in any market, the municipal bond market is driven by supply and demand for commodities such as conventional (i.e. “plain vanilla”) bond issues. However, markets can be created for unconventional structures given the right price. The question to SMP and the City is what would be the right price, or interest rate, in order to finance the monorail project? Is the price too steep to be a market maker given the benefits that the monorail project will provide to the taxpayers and citizens of Seattle?

- Deviation from a conventional debt financing approach increases risk. However, this does not mean that approaches that deviate from convention should not be considered. The greater the deviation from convention, the greater the risk. The cost of financing is directly related to risk.
- Even for conventional structures, any extension beyond the normal 30 years would decrease the relative amount available to projects and increase the total amount of debt service.
- Alternative financing structures are often considered to: 1) generate more net funds available for a project; and/or 2) provide a better matching of sources of funds for the payment of debt service. In the case of SMP, both of these outcomes are desirable given

the large construction cost requirement and the significant borrowing potential against the future growth of MVET.

- Given the limited capacity to pay debt service in the early years, zero coupon bonds are often the financing tool used to leverage funds. Issuers avoid using zero coupon bonds, if possible, given their non-callable feature and the interest rate penalty associated with it. The interest rate penalty could range from ½ percent to 1½ percent higher than current interest bonds depending on the maturity.
- It appears that there is a significant potential for leveraging future MVET growth, which SMP estimates to grow annually in the 6.0% range starting in 2012. Most bond issues for public transit projects are structured using historical revenue. In the case of SMP, no direct correlation exists between the project and the revenue source. The credit analysis will be based on the MVET forecast which may not provide sufficient comfort to investors.



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## **Appendix B: Resumes**



## **Dennis L. Markham**

Senior Associate  
Manuel Padron & Associates

### **EDUCATION:**

University of California, Berkeley  
University of California, Los Angeles

1986: Master of Business Administration  
1984: B.A. Economics-Business

### **EXPERIENCE HIGHLIGHTS:**

#### **Manuel Padron & Associates, Inc. (1990-Present)**

- Developed numerous operating and maintenance and cost allocation models for bus, light rail, heavy rail, automated guideway, commuter rail, intercity rail, and rail-diesel car modes.
- Designed and developed financial planning models for major transit agencies.
- Created custom transportation financial planning software for use by transit agencies and metropolitan planning organizations (MPOs) throughout the United States.
- Performed financial analyses and developed cash flow models for transit agencies, MPOs, and FTA Alternative Analyses/Major Investment Studies.
- Analyzed and recommended innovative financing techniques and new funding sources specific to transit agency needs.
- Evaluated financial and operating performance of transit agencies and recommended cost containment methods for contracted transit service.
- Developed integrated automated reporting system combining federal, state, and local required financial and operational reports for transit operators in the San Francisco Bay Area.
- Analyzed public transit funding needs in the state of California.
- Assessed transit operator performance, conducted performance audits, and determined funding allocations for various transit operators in California.
- Reviewed organizational structures of transit operators in the United States and abroad, and suggested organizational changes for Los Angeles MTA bus operations.

#### **DLM Consulting (1989-1990)**

- Created customized microcomputer-based financial cash flow models for government clients.
- Developed automated process for allocating time off to public transit personnel.

#### **Deloitte Haskins + Sells (1986-1989)**

- Developed sophisticated microcomputer-based financial cash flow models.
- Identified and solved problems for public transit and government clients.
- Assisted in development of transit operator attendance reporting and timekeeping systems.
- Responsible for planning, designing and implementing computer information systems. Trained client personnel to use various computer hardware and software.

#### **California Department of Transportation, Los Angeles (1980-1984)**

- Monitored traffic on Los Angeles area freeway system.
- Evaluated the public's traffic information needs and developed marketing strategies.

### **PROFESSIONAL ACTIVITIES:**

Transportation Research Board

### **PUBLICATIONS:**

Bryan K. Porter, Lillian E. Hames, and Dennis L. Markham, "Innovative Techniques for Revenue Capture and Capital Asset Management for Transit." *Public Transit* 1997, Transportation Research Record 1604 (1997): 101-108.

Albert Huerby, Nancy E. Whelan, and Dennis L. Markham, "Financial Capacity Analysis of the San Francisco Bay Area Rail Extension Program." *Public Transit*, Transportation Research Record 1266 (1990): 67-76.

# Nancy E. Whelan

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<b>Education</b>	<p>Master of Public Administration, Intergovernmental Management, University of Southern California</p> <p>Bachelor of Arts, Interamerican Studies and Public Administration, University of the Pacific</p>
<b>Experience Summary</b>	<p>Ms. Whelan has more than twenty years experience in public transportation agency management and in consulting to public transportation agencies. Her areas of expertise include strategic and financial planning, funding and grants management, capital project development, and organizational development. She has managed San Francisco Muni's \$2 billion capital program and has been responsible for bus and rail vehicle procurements in excess of \$750 million. She is experienced in applying creative solutions to funding issues.</p>
<b>Project Experience</b>	<ul style="list-style-type: none"><li>• <i>New Starts Rating Reports for MTA Transit Corridors</i> Assisted in the preparation of Federal Transit Administration (FTA) Section 5309 New Starts Reports for all transit corridors considered for the New Starts program since 2000. Prepared capital cash flows for projects, drafted the financial element of the submittal, and responded to FTA inquiries regarding the financial plan. Both the Eastside Light Rail line and the Exposition Corridor Light Rail line have received FTA ratings of "recommended" and the Eastside line is nearing completion of the Full Funding Grant Agreement.</li><li>• <i>Sacramento Regional Transit District, South Line Phase II Corridor Study, Preliminary Engineering and 5309 New Starts Rating Report</i> Developed a funding plan for the LRT extension. Using the RT's financial forecasting model, various sensitivity tests performed on the operating costs, the potential new sales tax revenues, fares, and regional revenues over the forecast period for the baseline and alternatives under consideration. Assisting in the evaluation federal funding strategies for the project in relation to the strategies for funding other LRT extensions. Developed the financial elements of the recent 5309 New Starts Rating submittal to FTA.</li><li>• <i>Transbay Joint Powers Authority Financial Planning and Analysis</i> Developed long-range funding plan for \$2 billion Transbay Terminal and Caltrain Downtown Extension Project. Analyzed potential revenue streams for debt financing, proposed bridge toll increase legislation, and sales tax reauthorization. Established policies and procedures and an annual budget for the new organization.</li><li>• <i>Caltrain/JPB 2020 Strategic Plan and Short Range Transit Plan</i> Responsible for the capital plan and capital and operating financial plans for the Caltrain Strategic Plan and Short Range Transit Plan. Developed project prioritization process, project funding plans, coordination with service plans, and assisted in the development of a database for the Capital Improvement Program (CIP).</li><li>• <i>Los Angeles MTA Long Range Financial Plan and Analysis</i> Assisted in the development of the financial element of MTA's 2001 Long Range Plan Transportation Plan. Analyzed and interpreted financial forecasting model results for the 25-year planning period. Documented assumptions and methodologies and prepared presentation materials used in the adopted plan.</li></ul>

# **Lisa Liang Siemsen**

## **EXPERIENCE**

### **Causeway Financial Consulting**

*Principal*

Oakland, California

January 1997 to Present

- Provide financial advisory services to public agencies including debt capacity analysis, capital planning, bond financing alternatives, credit review, document review and reinvestment strategies.
- Clients include San Francisco Municipal Railway, BART, Port Authority of Allegheny County, Alameda County Transportation Authority, Napa County Flood Control District, City and County of San Francisco and various other California Counties
- Recent projects include developing a management tool to monitor long-term capital program involving over 250 components, domestic leverage lease financings, and tax-exempt bond refunding .

### **Financial Security Assurance (Formerly Capital Guaranty)**

*Underwriting Officer, Underwriting Department*

San Francisco, California

March 1995 - December 1995

- Performed credit analysis of municipal governments issuing general obligation debt and hospitals seeking access to the tax-exempt capital market
- Performed pricing analysis including the integration of expected trading differential relative to the competitors to determine competitive pricing structure and return on allocated capital
- Credit review of health care issuers includes historical and proforma financial analysis, market analysis and discussion with management about their strategic plan vis-à-vis managed care

### **CS First Boston Corporation**

*Associate, Public Finance Department, Municipal Securities Division*

San Francisco, California

March 1992 - January 1995

- Provided investment banking services to municipal issuers and not-for-profit hospitals
- Managed working group members to ensure fluid communication between internal and external support for timely execution of financings
- Coordinated, prepared and rehearsed clients for rating agency presentations including credit analysis
- Developed extensive financial models to analyze various financing strategies and instruments including derivative products

## **EDUCATION**

John F. Kennedy School of Government, **Harvard University**

*Master in Public Policy*

Cambridge, Massachusetts

June 1991

**University of California, Berkeley**

*Bachelor of Arts* in Legal Studies

Berkeley, California

May 1989

# G. Kent Woodman

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## THOMPSON COBURN LLP

Mr. Woodman is Vice Chair of the firm's Transportation and International Commerce group. Mr. Woodman practices in the surface transportation area, with emphasis on procurement, Federal regulatory requirements, and transit labor.

Mr. Woodman's experience in the procurement area includes providing legal counsel regarding compliance with Federal competitive procurement requirements, preparation of procurement solicitation documents, adjudication of bid protests, and development of construction contracts, rolling stock acquisition agreements, and operations and maintenance contracts.

In the regulatory area, Mr. Woodman advises clients on a wide range of Federal requirements, including Buy America, environmental regulations, and Disadvantaged Business Enterprise. He also represents public transit agencies in the development and negotiation of full funding grant agreements with the Department of Transportation for the financing of major capital projects and the negotiation of other documents associated with major transit projects.

Mr. Woodman has considerable experience negotiating Section 13(c) labor protection agreements with transit unions, representing transit agencies in mediation and impasse resolution at the Department of Labor, and in arbitrations before both private arbitrators and the Department of Labor.

Mr. Woodman also has considerable expertise in working with all aspects of the legislative process on Capitol Hill, including preparing position papers and briefing documents, drafting legislative proposals and amendments, and preparing testimony for hearings.



### Education

- **Vanderbilt University School of Law**  
(J.D., 1974)
- **Oklahoma State University**  
(B.A., English 1971)

### Licensure

- District of Columbia
- Oklahoma

### Employment

- Thompson Coburn LLP  
Partner (2001-Present)
- Eckert Seamans Cherin & Mellott  
Partner (1985-2001)
- Federal Transit Administration  
Chief Counsel (1981-1984)  
Acting Administrator (1984)
- The National Law Center, George Washington University  
Adjunct Lecturer in Law (1977-1987)
- Office of the Legislative Counsel, United States House of Representatives  
Assistant Legislative Counsel (1974-1981)

# Mary Walther Pryor

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**Education** Master of Public Policy, University of California, Berkeley.

Bachelor of Arts, Political Science, University of California, Berkeley.

**Experience Summary** Ms. Pryor has six years of experience in multi-modal transportation planning and financial analyses. She has provided transit planning and financial analysis services for local and regional transit agencies. She has worked on numerous projects involving setting goals and objectives for transit plans and service restructurings; transit service and fare policy design; fare elasticity modeling; cost modeling; financial plan development; and policy and management recommendations for administrative and service improvements. She is a member of the Transportation Research Board Committee on Ferry Transportation.

**Project Experience**

- *Transbay Joint Powers Authority Financial Planning and Analysis*

Updated long-range funding plan for \$2 billion Transbay Terminal and Caltrain Downtown Extension Project, including operating and capital plans and cash flow for debt repayment. Assisted with revenue source tracking and applications, including TIFIA loan and SFCTA sales tax reauthorization. Prepared responses to comments on financial section of Draft EIS/EIR. Developed policies and procedures, an annual budget, and Human Resources options for the new organization.

- *Caltrain/JPB Capital Improvement Plan*

Assisted with the preparation of Caltrain's 5-Year financially constrained and 15-Year unconstrained Capital Improvement Plan (CIP). Developed multiple financial plans for various funding scenarios that coordinate with short- and long-term service plans.

- *Bay Area Water Transit Authority Cost Model and Ten Year Financial Plan*

Developed cost models for existing operators as well as a hybrid model to predict costs for a variety of future service options and vessel types. Developing a ten year financial plan for the multi-jurisdictional service area based on new funding sources and the WTA's Implementation and Operations Plan.

- *Sacramento Regional Transit District, South Line Phase II Corridor Study and Preliminary Engineering*

Developing a funding plan for the LRT extension. Using the RT's financial forecasting model, various sensitivity tests will be performed on the operating costs, the potential new sales tax revenues, fares, and regional revenues over the forecast period for the baseline and alternatives under consideration. Assisting in the evaluation federal funding strategies for the project in relation to the strategies for funding other LRT extensions.

- *Santa Monica Big Blue Bus Ten Year Capital Plan*

Assisted in the update and expansion of the Ten Year Plan. This project developed capital project evaluation criteria, applied the criteria to establish a prioritized list, identified project costs and revenues, and identified funding strategies. Developed operations funding plan based on various financial scenarios.

**Bruce B. Emory**

Vice President, Senior Associate  
Manuel Padron & Associates, Inc.

**EDUCATION:**

Georgia Institute of Technology  
Princeton University

1970: MSCE specializing in Transportation Planning  
1965: BSCE with Honors

**EXPERIENCE HIGHLIGHTS:****Manuel Padron & Associates (1988-Present)**

- System planning, station site planning and O&M costs for Georgia DOT commuter rail study.
- Rail operations planning and bus coordination for numerous corridor studies in Los Angeles.
- Studies of bus service and fare structure for Cobb County, Georgia.
- Future Transit Corridors Study for the Atlanta Regional Commission.
- Feeder Bus Plan for Metro Link light rail line in St. Louis.
- Multimodal Transportation Center study, Greensboro, North Carolina.
- Operating plans, O&M cost estimates for Newark-Elizabeth Rail Link alternatives (TSM, commuter rail, heavy rail, light rail, and AGT).
- Demand forecasting, rail and bus operations planning for 1996 Atlanta Summer Olympics
- Major Investment Studies (MIS) in Cincinnati, Tampa, and St. Louis.
- Service Implementation Plan for Regional Express Bus system in Seattle area.
- Operations planning for Link light rail system in Seattle.

**Metropolitan Atlanta Rapid Transit Authority (1974-1988)**

*Deputy Assistant General Manager for Operations Planning and Marketing* (1983-1988)

*Acting Director of Planning and Marketing* (1981-1983)

*Manager of Transit System Planning* (1974-1981)

- Directed long-range planning for bus and rail including patronage forecasts and studies of alternative modes, corridors and station locations.
- Developed long-range transit plans for the metropolitan Atlanta region. This involved reviewing rail facility design, preparing rail operating plans, and environmental studies.
- Directed bus and rail operations planning including facilities improvements, feeder bus networks and scheduling. Supervised service monitoring and evaluation.
- Directed financial planning and analyses including developing fare policy.
- Directed marketing, community relations, and customer service programs.

**Parsons Brinckerhoff-Tudor-Bechtel, Atlanta, Georgia (1970-1974)**

*Transportation Planner and Chief Transportation Planner*

- Patronage forecasts, bus and rail operations, ridership surveys and operating cost estimates.

**U.S. Navy, Civil Engineer Corps (1965-1969)**

Officer with various assignments in public works management and construction administration.

**PROFESSIONAL ACTIVITIES:**

Life Member of the Institute of Transportation Engineers.

Former Member, Bus Transit and Rail Transit Committees of the Transportation Research Board.

**Smith Myung**

Associate

Manuel Padron &amp; Associates, Inc.

**EDUCATION:**

University of Colorado

1994: M.A. Urban and Regional Planning

University of Michigan

1990: B.A. Political Science and History

**EXPERIENCE HIGHLIGHTS:****Manuel Padron & Associates (Nov 2003)****Parsons Transportation Group (2000 - 2003)***Travel Model Application/Development*

- Travel demand forecasts (EMME/2) for the Dubai Municipality's Beirut Road Traffic Impact Study (Dubai, United Arab Emirates).
- Travel demand forecasts (TRANPLAN) for City of Dallas' Cedars Tax Increment Financing (TIF) Transportation Study.
- Travel demand forecasts (TRANPLAN) for the Dallas Cowboys' Lower Cedars Stadium Traffic Analysis.
- Travel demand forecasts (EMME/2) for the Colorado Department of Transportation's Glenwood Spring to Aspen CIS/DEIS.
- Travel demand forecasts (EMME/2) for the Dubai Municipality's Palm Island Transportation Study.
- Travel demand forecasts (MinUTP) for the Regional Transportation District's West Corridor EIS/PE.
- Travel demand forecasts (EMME/2) for the Washington Metropolitan Area Transit Authority's (WMATA) Core Capacity Study.
- Travel demand forecasts (EMME/2) for the Dubai Municipality's Sheikh Zayed Road Corridor Study.
- Estimated trip generation models and developed a calibration data set using PUMS and SF3 data for the Puerto Rico Long Range Plan Update.
- Developed new free-flow speeds and volume-delay functions from speed survey data for use in DRCOG's Model Refresh Project in Denver, Colorado.
- Developed transit validation data from an on-board survey for use in the DRCOG's Model Refresh Project.
- Estimated trip attraction models from household survey data for use in DRCOG's Model Refresh Project.

**Denver Regional Transportation District, RTD (1993- 2000)***Transportation Planner III*

- Travel demand forecasts (MinUTP) for I-70, I-225, US-36, West Corridor, Southeast Corridor, Southwest Corridor Major Investment Studies and Guide the Ride Transit Tax Initiative.
- Prepared mobility data for RTD's Section 5309 submittal.
- Coordinated agency's Transit Development Program (6 year capital and operating program).

**AWARDS/ PAPERS/ PRESENTATIONS**

RTD's General Manager's Award for Excellence in Performance, 1999.

"Quantifying Special Generator Ridership in Transit Analysis," Transportation Research Board's Sixth Conference on the Application of Transportation Planning Methods, Dearborn, Michigan, May 1997.

**PROFESSIONAL REGISTRATION:**

American Planning Association (APA)